Batch ID: **R150056** Instrument ID **VOA4** Method: **SW8260**

MBLK Sample ID: **VBLKW-130705-R150056** Units: **µg/L** Analysis Date: **7/5/2013 10:41 AM**

Client ID: Run ID: **VOA4_130705A** SeqNo: **3279149** Prep Date: DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	U	1.0								
1,1,2,2-Tetrachloroethane	U	1.0								
1,1,2-Trichlor-1,2,2-trifluoroethane	U	1.0								
1,1,2-Trichloroethane	U	1.0								
1,1-Dichloroethane	U	1.0								
1,1-Dichloroethene	U	1.0								
1,2,4-Trichlorobenzene	U	1.0								
1,2-Dibromo-3-chloropropane	U	1.0								
1,2-Dibromoethane	U	1.0								
1,2-Dichlorobenzene	U	1.0								
1,2-Dichloroethane	U	1.0								
1,2-Dichloropropane	U	1.0								
1,3-Dichlorobenzene	U	1.0								
1,4-Dichlorobenzene	U	1.0								
2-Butanone	U	2.0								
2-Hexanone	U	2.0								
4-Methyl-2-pentanone	U	2.0								
Acetone	U	2.0								
Benzene	U	1.0								
Bromodichloromethane	U	1.0								
Bromoform	U	1.0								
Bromomethane	U	1.0								
Carbon disulfide	U	2.0								
Carbon tetrachloride	U	1.0								
Chlorobenzene	U	1.0								
Chloroethane	U	1.0								
Chloroform	U	1.0								
Chloromethane	U	1.0								
cis-1,2-Dichloroethene	U	1.0								
cis-1,3-Dichloropropene	U	1.0								
Cyclohexane	U	1.0								
Dibromochloromethane	U	1.0								
Dichlorodifluoromethane	U	1.0								
Dichloromethane	U	2.0								
Ethylbenzene	U	1.0								
Isopropylbenzene	U	1.0								

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150056** Instrument ID **VOA4** Method: **SW8260**

m,p-Xylene	U	2.0					
Methyl acetate	U	1.0					
Methyl tert-butyl ether	U	1.0					
Methylcyclohexane	U	1.0					
o-Xylene	U	1.0					
Styrene	U	1.0					
Tetrachloroethene	U	1.0					
Toluene	U	1.0					
trans-1,2-Dichloroethene	U	1.0					
trans-1,3-Dichloropropene	U	1.0					
Trichloroethene	U	1.0					
Trichlorofluoromethane	U	1.0					
Vinyl chloride	U	1.0					
Xylenes, Total	U	3.0					
Surr: 1,2-Dichloroethane-d4	58.38	1.0	*50*	*0*	*117*	*71-125*	*0*
Surr: 4-Bromofluorobenzene	50.59	1.0	*50*	*0*	*101*	*70-125*	*0*
Surr: Dibromofluoromethane	58.56	1.0	*50*	*0*	*117*	*74-125*	*0*
Surr: Toluene-d8	58.99	1.0	*50*	*0*	*118*	*78-123*	*0*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150056** Instrument ID **VOA4** Method: **SW8260**

LCS Sample ID: **VLCSW-130705-R150056** Units: **µg/L** Analysis Date: **7/5/2013 09:52 AM**
Client ID: Run ID: **VOA4_130705A** SeqNo: **3279148** Prep Date: DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	57.27	1.0	50	0	115	75-130				
1,1,2,2-Tetrachloroethane	41.16	1.0	50	0	82.3	74-123				
1,1,2-Trichlor-1,2,2-trifluoroethane	53.24	1.0	50	0	106	70-130				
1,1,2-Trichloroethane	47.97	1.0	50	0	95.9	80-120				
1,1-Dichloroethane	49.5	1.0	50	0	99	80-120				
1,1-Dichloroethene	53.49	1.0	50	0	107	75-130				
1,2,4-Trichlorobenzene	46.73	1.0	50	0	93.5	77-120				
1,2-Dibromo-3-chloropropane	43.12	1.0	50	0	86.2	68-120				
1,2-Dibromoethane	53.97	1.0	50	0	108	80-120				
1,2-Dichlorobenzene	48.71	1.0	50	0	97.4	80-120				
1,2-Dichloroethane	53.9	1.0	50	0	108	79-120				
1,2-Dichloropropane	46.65	1.0	50	0	93.3	80-120				
1,3-Dichlorobenzene	49.55	1.0	50	0	99.1	80-120				
1,4-Dichlorobenzene	48.61	1.0	50	0	97.2	80-120				
2-Butanone	95.96	2.0	100	0	96	60-140				
2-Hexanone	83.03	2.0	100	0	83	60-131				
4-Methyl-2-pentanone	90.85	2.0	100	0	90.8	60-135				
Acetone	104.1	2.0	100	0	104	60-140				
Benzene	49.41	1.0	50	0	98.8	80-120				
Bromodichloromethane	54.38	1.0	50	0	109	75-120				
Bromoform	54.99	1.0	50	0	110	70-130				
Bromomethane	48.81	1.0	50	0	97.6	63-139				
Carbon disulfide	102.5	2.0	100	0	103	75-125				
Carbon tetrachloride	50.57	1.0	50	0	101	75-125				
Chlorobenzene	49.53	1.0	50	0	99.1	80-120				
Chloroethane	50.83	1.0	50	0	102	70-130				
Chloroform	52.73	1.0	50	0	105	70-130				
Chloromethane	52.44	1.0	50	0	105	65-130				
cis-1,2-Dichloroethene	51.24	1.0	50	0	102	75-125				
cis-1,3-Dichloropropene	50.76	1.0	50	0	102	79-125				
Cyclohexane	49.05	1.0	50	0	98.1	75-125				
Dibromochloromethane	53.85	1.0	50	0	108	70-130				
Dichlorodifluoromethane	57.05	1.0	50	0	114	60-140				
Dichloromethane	43.16	2.0	50	0	86.3	75-125				
Ethylbenzene	51.66	1.0	50	0	103	80-120				
Isopropylbenzene	54.15	1.0	50	0	108	80-120				
m,p-Xylene	101.6	2.0	100	0	102	80-120				
Methyl acetate	47.07	1.0	50	0	94.1	76-122				

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150056** Instrument ID **VOA4** Method: **SW8260**

Methyl tert-butyl ether	49.13	1.0	50	0	98.3	70-125	
Methylcyclohexane	51.77	1.0	50	0	104	79-123	
o-Xylene	50.58	1.0	50	0	101	80-120	
Styrene	51.68	1.0	50	0	103	78-122	
Tetrachloroethene	56.51	1.0	50	0	113	75-130	
Toluene	49.06	1.0	50	0	98.1	80-121	
trans-1,2-Dichloroethene	52.98	1.0	50	0	106	75-125	
trans-1,3-Dichloropropene	49.7	1.0	50	0	99.4	76-125	
Trichloroethene	52.99	1.0	50	0	106	75-125	
Trichlorofluoromethane	56.85	1.0	50	0	114	72-132	
Vinyl chloride	53.27	1.0	50	0	107	70-135	
Xylenes, Total	152.2	3.0	150	0	101	80-124	
Surr: 1,2-Dichloroethane-d4	56.14	1.0	*50*	*0*	*112*	*71-125*	*0*
Surr: 4-Bromofluorobenzene	55.31	1.0	*50*	*0*	*111*	*70-125*	*0*
Surr: Dibromofluoromethane	57.77	1.0	*50*	*0*	*116*	*74-125*	*0*
Surr: Toluene-d8	57.63	1.0	*50*	*0*	*115*	*78-123*	*0*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150056** Instrument ID **VOA4** Method: **SW8260**

MS Sample ID: **1307039-03AMS** Units: **µg/L** Analysis Date: **7/5/2013 12:44 PM**

Client ID: **d-45** Run ID: **VOA4_130705A** SeqNo: **3279243** Prep Date: DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	60.97	1.0	50	0	122	75-130				
1,1,2,2-Tetrachloroethane	46.61	1.0	50	0	93.2	74-123				
1,1,2-Trichlor-1,2,2-trifluoroethane	58.64	1.0	50	0	117	70-130				
1,1,2-Trichloroethane	52.99	1.0	50	0	106	80-120				
1,1-Dichloroethane	52.17	1.0	50	0	104	80-120				
1,1-Dichloroethene	60.43	1.0	50	0	121	75-130				
1,2,4-Trichlorobenzene	52.83	1.0	50	0	106	77-120				
1,2-Dibromo-3-chloropropane	49.72	1.0	50	0	99.4	68-120				
1,2-Dibromoethane	57.73	1.0	50	0	115	80-120				
1,2-Dichlorobenzene	54.47	1.0	50	0	109	80-120				
1,2-Dichloroethane	98.83	1.0	50	42.68	112	79-120				
1,2-Dichloropropane	49.16	1.0	50	0	98.3	80-120				
1,3-Dichlorobenzene	55.73	1.0	50	0	111	80-120				
1,4-Dichlorobenzene	53.67	1.0	50	0	107	80-120				
2-Butanone	99.7	2.0	100	0	99.7	60-140				
2-Hexanone	102.1	2.0	100	0	102	60-131				
4-Methyl-2-pentanone	102.8	2.0	100	0	103	60-135				
Acetone	108.4	2.0	100	0	108	60-140				
Benzene	52.4	1.0	50	0	105	80-120				
Bromodichloromethane	55.98	1.0	50	0	112	75-120				
Bromoform	59.25	1.0	50	0	119	70-130				
Bromomethane	50.04	1.0	50	0	100	63-139				
Carbon disulfide	110.8	2.0	100	0	111	75-125				
Carbon tetrachloride	54.77	1.0	50	0	110	79-120				
Chlorobenzene	54.25	1.0	50	0	109	80-120				
Chloroethane	51.53	1.0	50	0	103	70-130				
Chloroform	61.48	1.0	50	7.313	108	70-130				
Chloromethane	51.9	1.0	50	0	104	65-130				
cis-1,2-Dichloroethene	54.63	1.0	50	0	109	75-125				
cis-1,3-Dichloropropene	51.07	1.0	50	0	102	79-125				
Cyclohexane	53.85	1.0	50	0	108	75-125				
Dibromochloromethane	58.52	1.0	50	0	117	70-130				
Dichlorodifluoromethane	64.18	1.0	50	0	128	60-140				
Dichloromethane	43.97	2.0	50	0	87.9	75-125				
Ethylbenzene	58.87	1.0	50	0	118	80-120				
Isopropylbenzene	62.36	1.0	50	0	125	80-120				S
m,p-Xylene	113.9	2.0	100	0	114	80-120				
Methyl acetate	50.54	1.0	50	0	101	76-122				

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150056**	Instrument ID **VOA4**		Method: **SW8260**				
Methyl tert-butyl ether	51.35	1.0	50	0	103	70-125	
Methylcyclohexane	58.16	1.0	50	0	116	79-123	
o-Xylene	55.75	1.0	50	0	112	80-120	
Styrene	56.78	1.0	50	0	114	78-122	
Tetrachloroethene	64.25	1.0	50	0	129	75-130	
Toluene	55.3	1.0	50	0	111	80-121	
trans-1,2-Dichloroethene	58.05	1.0	50	0	116	75-125	
trans-1,3-Dichloropropene	49	1.0	50	0	98	76-125	
Trichloroethene	57.21	1.0	50	0	114	75-125	
Trichlorofluoromethane	63.93	1.0	50	0	128	72-132	
Vinyl chloride	59.34	1.0	50	0	119	70-135	
Xylenes, Total	169.7	3.0	150	0	113	80-124	
Surr: 1,2-Dichloroethane-d4	52.72	1.0	*50*	*0*	*105*	*71-125*	*0*
Surr: 4-Bromofluorobenzene	55.11	1.0	*50*	*0*	*110*	*70-125*	*0*
Surr: Dibromofluoromethane	55.22	1.0	*50*	*0*	*110*	*74-125*	*0*
Surr: Toluene-d8	57.07	1.0	*50*	*0*	*114*	*78-123*	*0*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150056** Instrument ID **VOA4** Method: **SW8260**

MSD Sample ID: **1307039-03AMSD** Units: **µg/L** Analysis Date: **7/5/2013 01:09 PM**
Client ID: **d-45** Run ID: **VOA4_130705A** SeqNo: **3279244** Prep Date: DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	61.79	1.0	50	0	124	75-130	60.97	1.33	20	
1,1,2,2-Tetrachloroethane	47.36	1.0	50	0	94.7	74-123	46.61	1.6	20	
1,1,2-Trichlor-1,2,2-trifluoroethane	59.16	1.0	50	0	118	70-130	58.64	0.898	20	
1,1,2-Trichloroethane	52.14	1.0	50	0	104	80-120	52.99	1.61	20	
1,1-Dichloroethane	54.09	1.0	50	0	108	80-120	52.17	3.61	20	
1,1-Dichloroethene	58.98	1.0	50	0	118	75-130	60.43	2.44	20	
1,2,4-Trichlorobenzene	54.81	1.0	50	0	110	77-120	52.83	3.67	20	
1,2-Dibromo-3-chloropropane	52.03	1.0	50	0	104	68-120	49.72	4.54	20	
1,2-Dibromoethane	58.93	1.0	50	0	118	80-120	57.73	2.06	20	
1,2-Dichlorobenzene	55.3	1.0	50	0	111	80-120	54.47	1.52	20	
1,2-Dichloroethane	93.98	1.0	50	42.68	103	79-120	98.83	5.03	20	
1,2-Dichloropropane	48.71	1.0	50	0	97.4	80-120	49.16	0.913	20	
1,3-Dichlorobenzene	56.83	1.0	50	0	114	80-120	55.73	1.95	20	
1,4-Dichlorobenzene	54.52	1.0	50	0	109	80-120	53.67	1.56	20	
2-Butanone	103.9	2.0	100	0	104	60-140	99.7	4.08	20	
2-Hexanone	100.6	2.0	100	0	101	60-131	102.1	1.55	20	
4-Methyl-2-pentanone	105.3	2.0	100	0	105	60-135	102.8	2.48	20	
Acetone	103.5	2.0	100	0	103	60-140	108.4	4.66	20	
Benzene	52.74	1.0	50	0	105	80-120	52.4	0.635	20	
Bromodichloromethane	56.27	1.0	50	0	113	75-120	55.98	0.513	20	
Bromoform	60.61	1.0	50	0	121	70-130	59.25	2.26	20	
Bromomethane	49.82	1.0	50	0	99.6	63-139	50.04	0.439	20	
Carbon disulfide	113	2.0	100	0	113	75-125	110.8	1.89	20	
Carbon tetrachloride	54.48	1.0	50	0	109	75-125	54.77	0.53	20	
Chlorobenzene	54.72	1.0	50	0	109	80-120	54.25	0.851	20	
Chloroethane	55.37	1.0	50	0	111	70-130	51.53	7.18	20	
Chloroform	62.96	1.0	50	7.313	111	70-130	61.48	2.36	20	
Chloromethane	52.92	1.0	50	0	106	65-130	51.9	1.95	20	
cis-1,2-Dichloroethene	54.36	1.0	50	0	109	75-125	54.63	0.493	20	
cis-1,3-Dichloropropene	51.13	1.0	50	0	102	79-125	51.07	0.119	20	
Cyclohexane	55.82	1.0	50	0	112	75-125	53.85	3.61	20	
Dibromochloromethane	58.06	1.0	50	0	116	70-130	58.52	0.795	20	
Dichlorodifluoromethane	65.15	1.0	50	0	130	60-140	64.18	1.51	20	
Dichloromethane	44.95	2.0	50	0	89.9	75-125	43.97	2.21	20	
Ethylbenzene	58.02	1.0	50	0	116	80-120	58.87	1.45	20	
Isopropylbenzene	61.67	1.0	50	0	123	80-120	62.36	1.12	20	S
m,p-Xylene	114.3	2.0	100	0	114	80-120	113.9	0.319	20	
Methyl acetate	48.18	1.0	50	0	96.4	76-122	50.54	4.77	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150056**	Instrument ID **VOA4**			Method: **SW8260**					
Methyl tert-butyl ether	51.84	1.0	50	0	104	70-125	51.35	0.96	20
Methylcyclohexane	57.29	1.0	50	0	115	79-123	58.16	1.49	20
o-Xylene	56.12	1.0	50	0	112	80-120	55.75	0.649	20
Styrene	56.92	1.0	50	0	114	78-122	56.78	0.25	20
Tetrachloroethene	64.54	1.0	50	0	129	75-130	64.25	0.452	20
Toluene	55.52	1.0	50	0	111	80-121	55.3	0.407	20
trans-1,2-Dichloroethene	59.21	1.0	50	0	118	75-125	58.05	1.98	20
trans-1,3-Dichloropropene	49.48	1.0	50	0	99	76-125	49	0.974	20
Trichloroethene	59.14	1.0	50	0	118	75-120	57.21	3.32	20
Trichlorofluoromethane	62.89	1.0	50	0	126	72-132	63.93	1.64	20
Vinyl chloride	60.6	1.0	50	0	121	70-135	59.34	2.1	20
Xylenes, Total	170.4	3.0	150	0	114	80-124	169.7	0.427	20
Surr: 1,2-Dichloroethane-d4	54.59	1.0	*50*	*0*	*109*	*71-125*	*52.72*	*3.47*	*20*
Surr: 4-Bromofluorobenzene	54.73	1.0	*50*	*0*	*109*	*70-125*	*55.11*	*0.703*	*20*
Surr: Dibromofluoromethane	56.71	1.0	*50*	*0*	*113*	*74-125*	*55.22*	*2.66*	*20*
Surr: Toluene-d8	57.91	1.0	*50*	*0*	*116*	*78-123*	*57.07*	*1.46*	*20*

The following samples were analyzed in this batch:

1307039-01A	1307039-02A	1307039-03A
1307039-04A	1307039-06A	1307039-07A
1307039-08A	1307039-09A	1307039-10A
1307039-12A	1307039-13A	1307039-14A
1307039-15A	1307039-16A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

MBLK Sample ID: **VBLKW2-130705-R150105** Units: **µg/L** Analysis Date: **7/5/2013 10:16 PM**

Client ID: Run ID: **VOA4_130705D** SeqNo: **3280233** Prep Date: DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	U	1.0								
1,1,2,2-Tetrachloroethane	U	1.0								
1,1,2-Trichlor-1,2,2-trifluoroethane	U	1.0								
1,1,2-Trichloroethane	U	1.0								
1,1-Dichloroethane	U	1.0								
1,1-Dichloroethene	U	1.0								
1,2,4-Trichlorobenzene	U	1.0								
1,2-Dibromo-3-chloropropane	U	1.0								
1,2-Dibromoethane	U	1.0								
1,2-Dichlorobenzene	U	1.0								
1,2-Dichloroethane	U	1.0								
1,2-Dichloropropane	U	1.0								
1,3-Dichlorobenzene	U	1.0								
1,4-Dichlorobenzene	U	1.0								
2-Butanone	U	2.0								
2-Hexanone	U	2.0								
4-Methyl-2-pentanone	U	2.0								
Acetone	U	2.0								
Benzene	U	1.0								
Bromodichloromethane	U	1.0								
Bromoform	U	1.0								
Bromomethane	U	1.0								
Carbon disulfide	U	2.0								
Carbon tetrachloride	U	1.0								
Chlorobenzene	U	1.0								
Chloroethane	U	1.0								
Chloroform	U	1.0								
Chloromethane	U	1.0								
cis-1,2-Dichloroethene	U	1.0								
cis-1,3-Dichloropropene	U	1.0								
Cyclohexane	U	1.0								
Dibromochloromethane	U	1.0								
Dichlorodifluoromethane	U	1.0								
Dichloromethane	U	2.0								
Ethylbenzene	U	1.0								
Isopropylbenzene	U	1.0								
m,p-Xylene	U	2.0								
Methyl acetate	U	1.0								

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

Methyl tert-butyl ether	U	1.0					
Methylcyclohexane	U	1.0					
o-Xylene	U	1.0					
Styrene	U	1.0					
Tetrachloroethene	U	1.0					
Toluene	U	1.0					
trans-1,2-Dichloroethene	U	1.0					
trans-1,3-Dichloropropene	U	1.0					
Trichloroethene	U	1.0					
Trichlorofluoromethane	U	1.0					
Vinyl chloride	U	1.0					
Xylenes, Total	U	3.0					
Surr: 1,2-Dichloroethane-d4	54.63	1.0	*50*	*0*	*109*	*71-125*	*0*
Surr: 4-Bromofluorobenzene	48.5	1.0	*50*	*0*	*97*	*70-125*	*0*
Surr: Dibromofluoromethane	57.16	1.0	*50*	*0*	*114*	*74-125*	*0*
Surr: Toluene-d8	59.88	1.0	*50*	*0*	*120*	*78-123*	*0*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

LCS Sample ID: **VLCSW2-130705-R150105** Units: **µg/L** Analysis Date: **7/5/2013 09:27 PM**
Client ID: Run ID: **VOA4_130705D** SeqNo: **3280232** Prep Date: DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	53.38	1.0	50	0	107	75-130				
1,1,2,2-Tetrachloroethane	43.75	1.0	50	0	87.5	74-123				
1,1,2-Trichlor-1,2,2-trifluoroethane	49.01	1.0	50	0	98	70-130				
1,1,2-Trichloroethane	49.77	1.0	50	0	99.5	80-120				
1,1-Dichloroethane	46.22	1.0	50	0	92.4	80-120				
1,1-Dichloroethene	48.64	1.0	50	0	97.3	75-130				
1,2,4-Trichlorobenzene	48.12	1.0	50	0	96.2	77-120				
1,2-Dibromo-3-chloropropane	47.13	1.0	50	0	94.3	68-120				
1,2-Dibromoethane	54.81	1.0	50	0	110	80-120				
1,2-Dichlorobenzene	50.37	1.0	50	0	101	80-120				
1,2-Dichloroethane	51.05	1.0	50	0	102	79-120				
1,2-Dichloropropane	45.51	1.0	50	0	91	80-120				
1,3-Dichlorobenzene	50.93	1.0	50	0	102	80-120				
1,4-Dichlorobenzene	49.87	1.0	50	0	99.7	80-120				
2-Butanone	97.59	2.0	100	0	97.6	60-140				
2-Hexanone	91.61	2.0	100	0	91.6	60-131				
4-Methyl-2-pentanone	93.23	2.0	100	0	93.2	60-135				
Acetone	106.3	2.0	100	0	106	60-140				
Benzene	47.31	1.0	50	0	94.6	80-120				
Bromodichloromethane	51.38	1.0	50	0	103	75-120				
Bromoform	57.82	1.0	50	0	116	70-130				
Bromomethane	48.3	1.0	50	0	96.6	63-139				
Carbon disulfide	97.49	2.0	100	0	97.5	75-125				
Carbon tetrachloride	49.54	1.0	50	0	99.1	75-125				
Chlorobenzene	49.98	1.0	50	0	100	80-120				
Chloroethane	50.35	1.0	50	0	101	70-130				
Chloroform	48.6	1.0	50	0	97.2	70-130				
Chloromethane	50.85	1.0	50	0	102	65-130				
cis-1,2-Dichloroethene	49.26	1.0	50	0	98.5	75-125				
cis-1,3-Dichloropropene	48.14	1.0	50	0	96.3	79-125				
Cyclohexane	45.72	1.0	50	0	91.4	75-125				
Dibromochloromethane	54.52	1.0	50	0	109	70-130				
Dichlorodifluoromethane	54.45	1.0	50	0	109	60-140				
Dichloromethane	39.15	2.0	50	0	78.3	75-125				
Ethylbenzene	52.9	1.0	50	0	106	80-120				
Isopropylbenzene	55.53	1.0	50	0	111	80-120				
m,p-Xylene	103.8	2.0	100	0	104	80-120				
Methyl acetate	47.07	1.0	50	0	94.1	76-122				

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150105**	Instrument ID **VOA4**		Method: **SW8260**				
Methyl tert-butyl ether	48.37	1.0	50	0	96.7	70-125	
Methylcyclohexane	49.51	1.0	50	0	99	79-123	
o-Xylene	51.39	1.0	50	0	103	80-120	
Styrene	52.21	1.0	50	0	104	78-122	
Tetrachloroethene	56.94	1.0	50	0	114	75-130	
Toluene	49.74	1.0	50	0	99.5	80-121	
trans-1,2-Dichloroethene	50.79	1.0	50	0	102	75-125	
trans-1,3-Dichloropropene	47.46	1.0	50	0	94.9	76-125	
Trichloroethene	51.66	1.0	50	0	103	75-125	
Trichlorofluoromethane	53.01	1.0	50	0	106	72-132	
Vinyl chloride	51.25	1.0	50	0	102	70-135	
Xylenes, Total	155.2	3.0	150	0	103	80-124	
Surr: 1,2-Dichloroethane-d4	52.84	1.0	*50*	*0*	*106*	*71-125*	*0*
Surr: 4-Bromofluorobenzene	55.26	1.0	*50*	*0*	*111*	*70-125*	*0*
Surr: Dibromofluoromethane	54.83	1.0	*50*	*0*	*110*	*74-125*	*0*
Surr: Toluene-d8	58.5	1.0	*50*	*0*	*117*	*78-123*	*0*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

MS Sample ID: **1307036-05AMS** Units: **µg/L** Analysis Date: **7/5/2013 11:54 PM**

Client ID: Run ID: **VOA4_130705D** SeqNo: **3280237** Prep Date: DF: **10**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	532.2	10	500	0	106	75-130				
1,1,2,2-Tetrachloroethane	433.5	10	500	0	86.7	74-123				
1,1,2-Trichlor-1,2,2-trifluoroethane	504	10	500	0	101	70-130				
1,1,2-Trichloroethane	494.6	10	500	0	98.9	80-120				
1,1-Dichloroethane	471.1	10	500	0	94.2	80-120				
1,1-Dichloroethene	506.3	10	500	0	101	75-130				
1,2,4-Trichlorobenzene	438.4	10	500	0	87.7	77-120				
1,2-Dibromo-3-chloropropane	453.4	10	500	0	90.7	68-120				
1,2-Dibromoethane	553	10	500	0	111	80-120				
1,2-Dichlorobenzene	502.5	10	500	0	101	80-120				
1,2-Dichloroethane	517.9	10	500	0	104	79-120				
1,2-Dichloropropane	446.8	10	500	0	89.4	80-120				
1,3-Dichlorobenzene	502.8	10	500	0	101	80-120				
1,4-Dichlorobenzene	491.7	10	500	0	98.3	80-120				
2-Butanone	966.2	20	1000	0	96.6	60-140				
2-Hexanone	921.5	20	1000	0	92.1	60-131				
4-Methyl-2-pentanone	949	20	1000	0	94.9	60-135				
Acetone	972.1	20	1000	0	97.2	60-140				
Benzene	474.7	10	500	0	94.9	80-120				
Bromodichloromethane	532.4	10	500	0	106	75-120				
Bromoform	569.9	10	500	0	114	70-130				
Bromomethane	451.5	10	500	0	90.3	63-139				
Carbon disulfide	947.1	20	1000	0	94.7	75-125				
Carbon tetrachloride	481.9	10	500	0	96.4	79-120				
Chlorobenzene	504.4	10	500	0	101	80-120				
Chloroethane	496.2	10	500	0	99.2	70-130				
Chloroform	484.8	10	500	0	97	70-130				
Chloromethane	471.6	10	500	0	94.3	65-130				
cis-1,2-Dichloroethene	481.6	10	500	0	96.3	75-125				
cis-1,3-Dichloropropene	463.4	10	500	0	92.7	79-125				
Cyclohexane	451.9	10	500	0	90.4	75-125				
Dibromochloromethane	545.8	10	500	0	109	70-130				
Dichlorodifluoromethane	531	10	500	0	106	60-140				
Dichloromethane	408.7	20	500	0	81.7	75-125				
Ethylbenzene	523.5	10	500	0	105	80-120				
Isopropylbenzene	549.2	10	500	0	110	80-120				
m,p-Xylene	1035	20	1000	0	103	80-120				
Methyl acetate	469.3	10	500	0	93.9	76-122				

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

Methyl tert-butyl ether	502.4	10	500	40.9	92.3	70-125	
Methylcyclohexane	498	10	500	0	99.6	79-123	
o-Xylene	512.4	10	500	0	102	80-120	
Styrene	529.5	10	500	0	106	78-122	
Tetrachloroethene	569.2	10	500	0	114	75-130	
Toluene	509.7	10	500	0	102	80-121	
trans-1,2-Dichloroethene	492.3	10	500	0	98.5	75-125	
trans-1,3-Dichloropropene	449.7	10	500	0	89.9	76-125	
Trichloroethene	516.7	10	500	0	103	75-125	
Trichlorofluoromethane	544	10	500	0	109	72-132	
Vinyl chloride	508.4	10	500	0	102	70-135	
Xylenes, Total	1547	30	1500	0	103	80-124	
Surr: 1,2-Dichloroethane-d4	521.3	10	*500*	*0*	*104*	*71-125*	*0*
Surr: 4-Bromofluorobenzene	566.6	10	*500*	*0*	*113*	*70-125*	*0*
Surr: Dibromofluoromethane	541.3	10	*500*	*0*	*108*	*74-125*	*0*
Surr: Toluene-d8	586.7	10	*500*	*0*	*117*	*78-123*	*0*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

MSD Sample ID: **1307036-05AMSD** Units: **µg/L** Analysis Date: **7/6/2013 12:19 AM**

Client ID: Run ID: **VOA4_130705D** SeqNo: **3280238** Prep Date: DF: **10**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	558.9	10	500	0	112	75-130	532.2	4.88	20	
1,1,2,2-Tetrachloroethane	443.1	10	500	0	88.6	74-123	433.5	2.18	20	
1,1,2-Trichlor-1,2,2-trifluoroethane	520.4	10	500	0	104	70-130	504	3.19	20	
1,1,2-Trichloroethane	494.2	10	500	0	98.8	80-120	494.6	0.0786	20	
1,1-Dichloroethane	486.2	10	500	0	97.2	80-120	471.1	3.15	20	
1,1-Dichloroethene	548.7	10	500	0	110	75-130	506.3	8.03	20	
1,2,4-Trichlorobenzene	465.1	10	500	0	93	77-120	438.4	5.91	20	
1,2-Dibromo-3-chloropropane	462.7	10	500	0	92.5	68-120	453.4	2.02	20	
1,2-Dibromoethane	552	10	500	0	110	80-120	553	0.179	20	
1,2-Dichlorobenzene	513.3	10	500	0	103	80-120	502.5	2.13	20	
1,2-Dichloroethane	536.1	10	500	0	107	79-120	517.9	3.46	20	
1,2-Dichloropropane	470.5	10	500	0	94.1	80-120	446.8	5.18	20	
1,3-Dichlorobenzene	514.5	10	500	0	103	80-120	502.8	2.3	20	
1,4-Dichlorobenzene	499.9	10	500	0	100	80-120	491.7	1.66	20	
2-Butanone	957.2	20	1000	0	95.7	60-140	966.2	0.934	20	
2-Hexanone	903.8	20	1000	0	90.4	60-131	921.5	1.93	20	
4-Methyl-2-pentanone	934.9	20	1000	0	93.5	60-135	949	1.5	20	
Acetone	975.4	20	1000	0	97.5	60-140	972.1	0.339	20	
Benzene	503.7	10	500	0	101	80-120	474.7	5.94	20	
Bromodichloromethane	546.1	10	500	0	109	75-120	532.4	2.54	20	
Bromoform	574.6	10	500	0	115	70-130	569.9	0.808	20	
Bromomethane	493.8	10	500	0	98.8	63-139	451.5	8.97	20	
Carbon disulfide	1030	20	1000	0	103	75-125	947.1	8.42	20	
Carbon tetrachloride	505.5	10	500	0	101	75-125	481.9	4.78	20	
Chlorobenzene	514.3	10	500	0	103	80-120	504.4	1.94	20	
Chloroethane	518.8	10	500	0	104	70-130	496.2	4.44	20	
Chloroform	510.9	10	500	0	102	70-130	484.8	5.24	20	
Chloromethane	513.7	10	500	0	103	65-130	471.6	8.53	20	
cis-1,2-Dichloroethene	494	10	500	0	98.8	75-125	481.6	2.55	20	
cis-1,3-Dichloropropene	491.4	10	500	0	98.3	79-125	463.4	5.85	20	
Cyclohexane	479.2	10	500	0	95.8	75-125	451.9	5.86	20	
Dibromochloromethane	551.5	10	500	0	110	70-130	545.8	1.04	20	
Dichlorodifluoromethane	560.4	10	500	0	112	60-140	531	5.39	20	
Dichloromethane	421.5	20	500	0	84.3	75-125	408.7	3.08	20	
Ethylbenzene	535.5	10	500	0	107	80-120	523.5	2.26	20	
Isopropylbenzene	563.2	10	500	0	113	80-120	549.2	2.51	20	
m,p-Xylene	1055	20	1000	0	106	80-120	1035	1.92	20	
Methyl acetate	456.9	10	500	0	91.4	76-122	469.3	2.68	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Work Order: 1307039
Project: Formosa Supplemental AOC 2013

QC BATCH REPORT

Batch ID: **R150105** Instrument ID **VOA4** Method: **SW8260**

Methyl tert-butyl ether	537.4	10	500	40.9	99.3	70-125	502.4	6.73	20
Methylcyclohexane	537	10	500	0	107	79-123	498	7.55	20
o-Xylene	528.9	10	500	0	106	80-120	512.4	3.16	20
Styrene	536.5	10	500	0	107	78-122	529.5	1.31	20
Tetrachloroethene	588.5	10	500	0	118	75-130	569.2	3.33	20
Toluene	511.4	10	500	0	102	80-121	509.7	0.334	20
trans-1,2-Dichloroethene	526.3	10	500	0	105	75-125	492.3	6.67	20
trans-1,3-Dichloropropene	471.9	10	500	0	94.4	76-125	449.7	4.82	20
Trichloroethene	541.7	10	500	0	108	75-120	516.7	4.72	20
Trichlorofluoromethane	558.1	10	500	0	112	72-132	544	2.56	20
Vinyl chloride	544.7	10	500	0	109	70-135	508.4	6.89	20
Xylenes, Total	1584	30	1500	0	106	80-124	1547	2.33	20
Surr: 1,2-Dichloroethane-d4	547.4	10	*500*	*0*	*109*	*71-125*	*521.3*	*4.88*	*20*
Surr: 4-Bromofluorobenzene	559.4	10	*500*	*0*	*112*	*70-125*	*566.6*	*1.28*	*20*
Surr: Dibromofluoromethane	566.6	10	*500*	*0*	*113*	*74-125*	*541.3*	*4.56*	*20*
Surr: Toluene-d8	588	10	*500*	*0*	*118*	*78-123*	*586.7*	*0.224*	*20*

The following samples were analyzed in this batch:

1307039-02A	1307039-05A	1307039-11A
1307039-17A	1307039-18A	1307039-19A
1307039-20A	1307039-21A	1307039-22A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Tetra Tech
Project: Formosa Supplemental AOC 2013
WorkOrder: 1307039

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Units Reported	Description
mg/L	Milligrams per Liter

ALS Environmental

Sample Receipt Checklist

Client Name: **TETRA TECH AUSTIN** Date/Time Received: **29-Jun-13 10:35**

Work Order: **1307039** Received by: **RDH**

Checklist completed by Sarah M. Giga (eSignature) 01-Jul-13 (Date) Reviewed by: Kristin M Brown (eSignature) 02-Jul-13 (Date)

Matrices: Water
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	2.3c/2.3c C/U	IR1	
Cooler(s)/Kit(s):	2636		
Date/Time sample(s) sent to storage:	7/1/13 17:10		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

SRC Page 1 of 1

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Holland, MI +1 616 399 6070

ALS Environmental

Chain of Custody For

Page 1 of 3

COC ID: 83080

1307039

TETRA TECH AUSTIN: Tetra Tech

Project: Formosa Supplemental AOC 2013

Customer Information		Project Information			
Purchase Order	114-021458	Project Name	Formosa Supplemental AOC 2013	A	VOC (8260) TCL
Work Order		Project Number		B	
Company Name	Tetra Tech	Bill To Company	Tetra Tech	C	
Send Report To	Eric Klink	Invoice Attn	Eric Klink	D	
Address	9911 N. Capital of Texas Hwy Bldg 2 # 2310	Address	9911 N. Capital of Texas Hwy Bldg 2 # 2310	E	
City/State/Zip	Austin, TX 78759	City/State/Zip	Austin, TX 78759	F	
Phone	(512) 338-1667	Phone	(512) 338-1667	G	
Fax		Fax		H	
e-Mail Address		e-Mail Address		I	
				J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	B-3	6/27/13	1025	W	1	3	3										
2	B-1		1125	W	1	3	3										
3	d-45		1205	W	1	3	3										
4	d-46		1300	W	1	3	3										
5	FB-01		1320	W	1	3	3										
6	B-7		1410	W	1	3	3										
7	B-8		1515	W	1	3	3										
8	d-47		1605	W	1	3	3										
9	B-4		1705	W	1	3	3										
10	B-2		1735	W	1	3	3										

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Sampler(s) Please Print & Sign: Chris Fankhauser

Shipment Method: Fed EX

Required Turnaround Time: (Check Box) ☑ Std 10 WK Days ☐ 5 WK Days ☐ Other 2 WK Days ☐ 24 Hour

Results Due Date:

Relinquished by: [signature] Date: 6/28/13 Time: 1830

Received by:

Notes: 10 Day TAT.

Relinquished by: Date: Time:

Received by (Laboratory): [signature] 6/29/13 1035

Logged by (Laboratory): Date: Time:

Checked by (Laboratory):

Cooler ID: Cooler Temp:

QC Packages: (Check One Box Below)
☐ Level II Std QC ☑ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other / EDD

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-NaHSO$_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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ALS Environmental

Chain of Custody Form

COC ID: 83081

ALS Project Manager: | ALS Work Order #: PX1C338

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order	114-021486	Project Name	Formosa Supplemental AOC 2013	A VOC (8260) TCL
Work Order		Project Number		B
Company/Address	Tetra Tech	Bill To Company	Tetra Tech	C
Send Report To	Eric Klink	Invoice Attn	Eric Klink	D
Address	8911 N. Capital of Texas Hwy Bldg 2 # 2310	Address	8911 N. Capital of Texas Hwy Bldg 2 # 2310	E F
City/State/Zip	Austin, TX 78759	City/State/Zip	Austin, TX 78759	G
Phone	(512) 338-1667	Phone	(512) 338-1667	H
Fax		Fax		I
e-Mail Address		e-Mail Address		J

No.	Sample Description	Date	Time	Matrix	Preserv.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	B-6	6/27/13	1820	W	1	3	3										
2	MS/MSD	6/27/13	1205	W	1	3	3										
3	Dup-01	6/27/13	0000	W	1	3	3										
4	P-62	6/28/13	1020	W	L	3	3										
5	P-61	6/28/13	1110	W	L	3	3										
6	P-68	6/28/13	1240	W	L	3	3										
7	FB-02	6/28/13	1300	W	L	3	3										
8	P-66	6/28/13	1355	W	L	3	3										
9	P-65	6/28/13	1440	W	L	3	3										
10	P-64	6/28/13	1520	W	L	3	3										

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Sample(s) Please Print & Sign: Chris Fredericks

Shipment Method: Fed Ex

Required Turnaround Time: (Check Box) ☐ Other ☑ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☑ 24 Hour

Results Due Date:

Relinquished by: | Date: 6/28/13 | Time: 1830 | Received by:

Notes: 10 Day TAT.

Relinquished by: | Date: | Time: | Received by (Laboratory): 6/29/13 1035

Cooler ID | Cooler Temp.

Logged by (Laboratory): | Date: | Time: | Checked by (Laboratory):

QC Package: (Check One Box Below)
- ☐ Level II Std QC
- ☐ Level III Std QC/Raw Data
- ☐ Level IV SW846/CLP
- ☐ Other / EDD
- ☑ TRRP Checklist
- ☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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South Charleston, WV +1 304 356 3168
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ALS Environmental

Chain of Custody Form

COC ID: 83082

ALS Project Manager: | ALS Work Order #: A2S1838

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	114-021486	Project Name	Formosa Supplemetal AOC 2013	A	VOC (8260) TCL
Work Order		Project Number		B	
Company Name	Tetra Tech	Bill To Company	Tetra Tech	C	
Send Report To	Eric Klink	Invoice Attn	Eric Klink	D	
Address	3911 N. Capital of Texas Hwy Bldg 2 # 2310	Address	3911 N. Capital of Texas Hwy Bldg 2 # 2310	E	
				F	
City/State/Zip	Austin, TX 78759	City/State/Zip	Austin, TX 78759	G	
Phone	(512) 338-1667	Phone	(512) 338-1667	H	
Fax		Fax		I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Preservative	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	P-63	6/28/13	1610	W	1	3	3										
2	Dup-02	6/28/13	0000	W	1	3	3										
3	Trip Blank	Lab Supplied	Lab Supplied	W	1	2	2										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

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Sampler(s) Please Print & Sign: Chris Fontaine

Shipment Method: FedEx

Required Turnaround Time: (Check Box) ☑ Std 10 WK Days ☐ 5 WK Days ☐ Other: ☐ 2 WK Days ☐ 24 Hour

Results Due Date:

Relinquished by: | Date: 6/28/13 | Time: 1830 | Received by:

Notes: 10 Day TAT.

Relinquished by: | Date: | Time: | Received by (Laboratory): | Date: 6/28/13 | Time: 1085

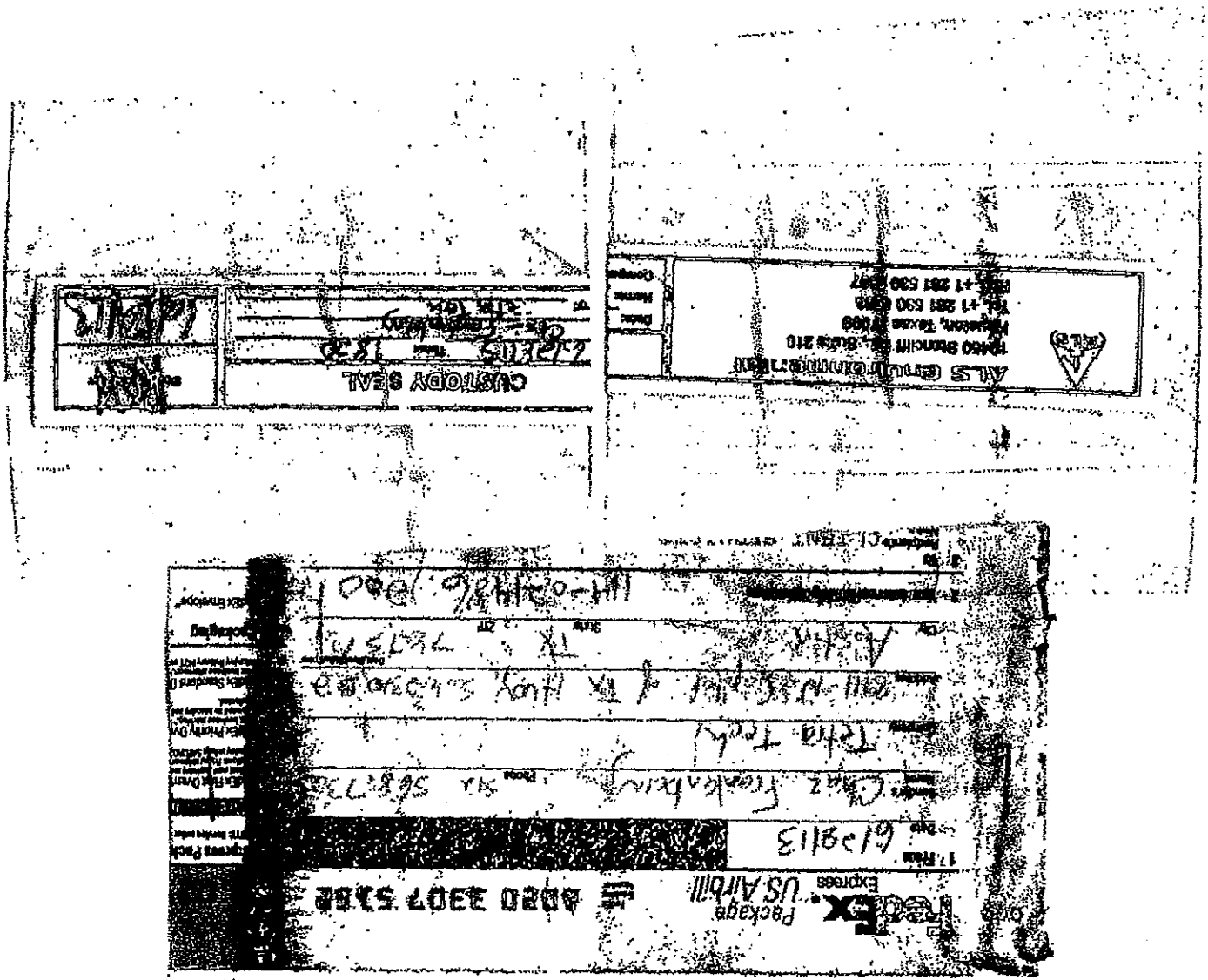
Logged by (Laboratory): | Date: | Time: | Checked by (Laboratory):

Cooler ID | Cooler Temp.

QC Package: (Check One Box Below)
☐ Level II Std QC ☑ TRRP CheckList
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other / EDD

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.



APPENDIX E
DATA USABILITY REPORT (QAA)

SITE:	Formosa Plastics Corporation, Texas
CLIENT:	Tetra Tech
EVENT:	Supplemental AOC Characterization – June 2013
INTENDED USE:	The data will be used to evaluate whether the extent of groundwater impacts has been adequately characterized relative to applicable Protective Concentration Levels (PCLs). The data will be used in the Supplemental AOC Characterization Report and in the subsequent Revised Site-Wide Risk Management Plan.
LABORATORY:	ALS Environmental (Houston, TX) Work Order 1307039 TLAP Certification T104704231
TESTS/METHODS:	Volatile Organics (VOCs) by SW-846 8260C – fifty (50) target analytes
SAMPLES:	17 groundwater samples, 2 field duplicates, 1 field MS/MSD pair, 2 field blanks, 1 trip blank (See Table 1 for a complete listing.)

QAA completed a third-party review of the above chemical analysis data for conformance with the requirements of the Texas Risk Reduction Program (TRRP) guidance document, Review and Reporting of COC Concentration Data (RGG-366/TRRP-13 Revised May 2010) and adherence to project objectives. The results of the review are discussed in this data usability summary (DUS).

All VOC samples collected and analyzed during the event were included in the review. QAA completed the review using the following laboratory submittals and project data:

- Laboratory reportable data as defined in TRRP-13;
- Laboratory review checklists (LRC) with the associated exception reports;
- Laboratory Electronic Data Deliverable (EDD); and
- Project field notes from the sampling event.

The review of the reportable data included the Quality Control (QC) parameters listed below, as required per TRRP-13, using the applicable analytical method and project requirements:

- Data Completeness
- Chain-of-Custody Procedures
- Sample Condition - Holding Time, Preservation, and Containers
- Field Procedures
- Results Reporting Procedures
- Laboratory and Field QC Blanks
- Laboratory Control Spike and Matrix Spike Recoveries
- Surrogate Recoveries
- Laboratory and Field Duplicate Precision

Additionally, QAA used the LRCs to evaluate the following QC parameters:

- Method Quantitation Limits (MQLs)
- Method Detection Limits (MDLs)
- Instrument Tuning, Calibration, and Performance
- Internal Standards

No project specific criteria have been specified for this site and thus the reviewer selected appropriate criteria as follows:

- Organics: 60-140% spike recovery (and not less than 10% or data is rejected) and ±MQL difference (if either result is less than 5x MQL) or 40% RPD (for laboratory duplicates) as recommended in TRRP-13
- Groundwater Samples: ± 2x MQL difference (if either result is less than 5x MQL) or 30% RPD (for field duplicates) as recommended in TRRP-13 as recommended in TRRP-13

If an item was found outside of the review criteria, the reviewer applied a data qualifier (DQ) and bias code to the results for the affected samples in accordance with TRRP-13. A list of all qualified results and definitions of the qualifier and bias codes are given in Table 2.

GLOSSARY OF TERMS

The following definitions apply for terms related to analyte reporting limits:

MDL (Method Detection Limit) – the minimum concentration of an analyte that the laboratory can measure and report with 99% confidence that the analyte concentration is greater than zero. The MDL is determined by the laboratory for each analyte in a given reagent matrix (water or soil) generally using the procedures specified in 40 CFR Part 136, Appendix B. It is a measure of the concentration an instrument can detect or 'see' in a given reagent matrix. TRRP-13 requires that the laboratory routinely check the MDL for reasonableness.

SDL (Sample Detection Limit) – the MDL adjusted to reflect sample-specific actions, such as dilution or use of smaller aliquot sizes than prescribed in the analytical method, and taking into account sample characteristics, sample preparation, and analytical adjustments including dry-weight adjustments. It is a measure of the concentration an instrument can detect or 'see' in a given sample. For TRRP, non-detects are reported using the SDL. This term was originally called the SQL (Sample Quantitation Limit) before the TRRP rule revisions effective March 19, 2007.

Unadjusted MQL (Method Quantitation Limit) – the lowest non-zero concentration standard in the laboratory's initial calibration curve calculated using the normal aliquot sizes and final volumes prescribed in the analytical method. The unadjusted MQL is reported by the laboratory for each analyte in a given matrix (water or soil). It is a measure of the concentration an instrument can accurately measure in a typical sample. Per TRRP, the Unadjusted MQLs should be below the Levels of Required Performance (LORPs) for purposes of assessment as well as demonstration of conformance with critical Protective Concentration Levels (PCLs).

MQL – the unadjusted MQL adjusted to reflect sample-specific actions, such as dilution or use of smaller aliquot sizes than prescribed in the analytical method, and takes into account sample characteristics, sample preparation, and analytical adjustments including dry-weight adjustments. It is a measure of the concentration an instrument can accurately measure in a given sample. Analytes with concentrations above the SDL but below the MQL, though present in the sample, may not be accurately measured and are thus flagged as estimated (J).

LABORATORY CERTIFICATION

At the time the laboratory data were generated for this project, the laboratory was NELAC accredited under the Texas Laboratory Accreditation Program (TLAP) for the matrices, methods and parameters of analysis requested on the chain-of-custody form except for cyclohexane by SW-846 8260, which is reported for all aqueous samples. The TCEQ does not offer accreditation for this analyte, in this matrix, analyzed by this method. The reviewer qualified all results for cyclohexane as not offered for accreditation (X7). A copy of the applicable pages of the laboratory's National Environmental Laboratory Accreditation Program (NELAP) certificate valid during the period in which the laboratory generated the data in this report is included in Attachment 1 to this DUS.

USABILITY SUMMARY

1. Usability of Unqualified Non-Detects – Non-detects are reported with the SDL, which is derived from the MDL, as required per TRRP. Additionally, according to the LRCs, an MDL study was performed for each target analyte and the MDLs were checked for reasonableness. The Levels of Required Performance (LORPs) for the site have been defined by Tetra Tech as the Tier 1 PCLs for commercial/industrial land use with Class 2 groundwater classification. As needed per TRRP, the Unadjusted MQLs stated by the laboratory are at or below the LORP for all target analytes except 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, and dichloromethane. Non-detect data for these analytes may not demonstrate conformance with critical PCLs. The two brominated analytes have particularly low PCLs that are not typically achieved by laboratories. For dichloromethane, the laboratory MDL is below the LORP.

2. Usability of Qualified Data – There are no major QC deficiencies, and thus all data is usable as qualified for the intended use. As shown in Table 2, the reviewer qualified some results as potentially contaminated (U) or not accredited (X7). The reviewer qualified all nine detects for acetone as potentially contaminated (U) due to detection of the analyte in the associated field blank. In each case, the analyte should be considered not detected at or above the reported concentration. The results for cyclohexane are qualified as not accredited (X7) because the TCEQ does not offer accreditation for this analyte, in this matrix, analyzed by this method. QC results for cyclohexane are reported and meet the requirements for all of the blanks and spikes, and the laboratory is accredited for other analytes by this method. Additionally, results with a laboratory J-flag (i.e., at a concentration between the SDL and MQL) should be considered estimates. The actual value is not expected to exceed the sample MQL.

QAA Reviewer: Taryn G. Scholz (Name) 8/12/13 (Date)

QC PARAMETER	QC OUTCOME
Data Completeness	The laboratory data package contains all necessary data (i.e., the laboratory reportable data per TRRP-13) and the EDD contains all sample results in an acceptable format. No revisions were required.
Chain-of-Custody Procedures	Proper sample custody procedures were used, which confirms that the integrity of the samples was maintained. Additionally, the information on the custody record is complete and agrees with that in the field notes and laboratory report, except as follows: • The sample ID for the field MS/MSD pair is not provided on the custody record. The laboratory assigned the ID using the sample date and time and the reviewer confirmed the assignment is correct per the sampler. The reviewer also confirmed that all tests are reported as requested on the custody record and found no discrepancies.
Sample Condition	Samples were collected in appropriate containers, properly preserved in the field, received in good condition at the laboratory, and prepared and analyzed within the holding times in the analytical methods, which ensures that samples were not affected by analyte degradation.
Field Procedures	The wells were sampled using low-flow methods (i.e., using a peristaltic pump). Water level and water quality measurements were recorded and the pH, temperature, and specific conductance were stable at collection. All samples were placed immediately into sterilized jars (preserved VOA vials) and then into a cooler with ice. One groundwater field duplicate and one field blank was collected for each of the two days of sampling and one field MS/MSD was collected with the seventeen (17) environmental samples. Additionally, a trip blank was placed in the sample cooler.
Results Reporting Procedures	For all target analytes, the hardcopy analytical results include a Result, SDL and MQL. The EDD includes a sample_quantitation_limit (which is the SDL), method_detection_limit (MDL), unadjusted_MQL, and MQL. Results are reported in mg/L. Non-detects are reported using the SDL as specified per TRRP and detects between the SDL and MQL are reported with a laboratory J-flag. The concentration reported for detects between the SDL and MQL is below the calibration range and thus is considered estimated. One sample (B-1) required dilution for chloroform. There are no samples with elevated reporting limits for a non-detect.
MQLs	The Levels of Required Performance (LORPs) for the site have been defined by Tetra Tech as the Tier 1 Protective Concentration Levels (PCLs) for commercial/industrial land use with Class 2 groundwater classification (i.e., the C/I $^{GW}GW_{Ing}$ in TCEQ Table 3). The unadjusted MQLs stated by the laboratory are at or below the LORPs for all of the target analytes, except as follows:

Analyte	LORP (mg/L)	Laboratory MDL (mg/L)	Laboratory MQL (mg/L)
1,2-Dibromo-3-chloropropane	0.00020	0.00050	0.0010
1,2-Dibromoethane	0.000050	0.00030	0.0010
Dichloromethane	0.0050	0.00050	0.010

QC PARAMETER	QC OUTCOME
MDLs	According to the laboratory, an MDL study was performed for each target analyte, and the MDLs were checked for reasonableness and either adjusted or supported by the analysis of detectability check samples (DCS) as required per TRRP-13. Results for the DCS are included in the laboratory data package (on the Method Detection / Reporting Limits report).
Laboratory Blanks	No target analytes are reported above the detection limit in the laboratory blanks, which confirms that no contamination was introduced in the laboratory.
Field QC Blanks	No target analytes are reported above the detection limit in the field or trip blanks, which confirms that no VOC contamination was introduced during collection and shipment, except as follows:

Analyte	Blank ID	Collection Date	Blank Type	Blank Concentration
Acetone	FB-01	06/27/2013	Field	0.0062 mg/L
Acetone	FB-02	06/28/2013	Field	0.0069 mg/L

Results for samples collected on the same day as a contaminated field blank may be affected by field contamination. Thus, the reviewer qualified the detects in the associated samples with concentrations at or below ten times that in the blank for this common contaminant as potentially contaminated (U).

Laboratory Control Spike Recovery	The laboratory prepared one laboratory control spike (LCS) for each analytical batch and reported recoveries for all of the target analytes. The LCS recoveries are within the TRRP recommended limits, which indicates good accuracy for the preparation and analysis technique on a sample free of matrix effects.
Matrix Spike Recovery	The laboratory prepared one matrix spike (MS) and matrix spike duplicate (MSD) for each analytical batch and reported recoveries for all of the target analytes. One MS/MSD pair was prepared using a groundwater sample from the site (d-45). (The reviewer did not evaluate MS/MSD pairs prepared using a sample from another site since they do not reflect on data quality for Formosa samples.) The site MS/MSD recoveries are within the TRRP recommended criteria, which indicates good accuracy for the preparation and analysis technique on the given sample matrix.
Surrogate Recovery	Surrogate recoveries are within the laboratory limits, which indicates that the overall accuracy of the preparation and analysis technique is good for each particular sample.
Laboratory Duplicate Precision	The RPDs for the site MS/MSD pair are within the TRRP recommended limit, which indicates good precision for the preparation and analysis technique on the given sample matrix.
Field Duplicate Precision	Two field duplicates were collected with the seventeen (17) environmental samples including one for each day of sample collection. Results are summarized in Table 3. RPDs (or the absolute difference between results for concentrations <5xMQL and for non-detects) are within the TRRP criteria for all target analytes.
Instrument Tuning, Calibration, and Performance	According to the LRC, instrument tuning and initial and continuing calibration data met method requirements for the samples, which indicates the instruments were properly calibrated to measure target analyte concentrations.
Internal Standards	According to the LRC, area counts and retention times were within method requirements.

TABLE 1

FORMOSA PLASTICS CORPORATION, TEXAS

SUPPLEMENTAL AOC CHARACTERIZATION – JUNE 2013

SAMPLES COLLECTED

Laboratory ID	Field ID	Sample Matrix	Sample Type	Sample Date	Dilution Factor	8260C VOC QC Batch
1307039-01A	B-3	Aqueous	ENV	06/27/2013	1	R150056
1307039-02A	B-1	Aqueous	ENV	06/27/2013	1	R150105
1307039-02A	B-1	Aqueous	ENV DL	06/27/2013	10	R150056
1307039-03A	d-45	Aqueous	ENV with MS/MSD	06/27/2013	1	R150056
1307039-04A	d-46	Aqueous	ENV	06/27/2013	1	R150056
1307039-05A	FB-01	Aqueous	FB	06/27/2013	1	R150105
1307039-06A	B-7	Aqueous	ENV	06/27/2013	1	R150056
1307039-07A	B-8	Aqueous	ENV	06/27/2013	1	R150056
1307039-08A	d-47	Aqueous	ENV	06/27/2013	1	R150056
1307039-09A	B-4	Aqueous	ENV	06/27/2013	1	R150056
1307039-10A	B-2	Aqueous	ENV	06/27/2013	1	R150056
1307039-11A	B-6	Aqueous	ENV	06/27/2013	1	R150105
1307039-12A	Dup-01	Aqueous	FD at d-45	06/27/2013	1	R150056
1307039-13A	p-62	Aqueous	ENV	06/28/2013	1	R150056
1307039-14A	p-61	Aqueous	ENV	06/28/2013	1	R150056
1307039-15A	p-68	Aqueous	ENV	06/28/2013	1	R150056
1307039-16A	FB-02	Aqueous	FB	06/28/2013	1	R150056
1307039-17A	p-66	Aqueous	ENV	06/28/2013	1	R150105
1307039-18A	p-65	Aqueous	ENV	06/28/2013	1	R150105
1307039-19A	p-64	Aqueous	ENV	06/28/2013	1	R150105
1307039-20A	p-63	Aqueous	ENV	06/28/2013	1	R150105
1307039-21A	Dup-02	Aqueous	FD at p-68	06/28/2013	1	R150105
1307039-22A	Trip Blank - 061813-93	Aqueous	TB	06/27/2013	1	R150105

ENV – Environmental
DL – Dilution (secondary)
FB – Field blank
FD – Field duplicate
MS/MSD – Matrix spike/matrix spike duplicate
TB – Trip blank

TABLE 2
FORMOSA PLASTICS CORPORATION, TEXAS
SUPPLEMENTAL AOC CHARACTERIZATION – JUNE 2013

QUALIFIED SAMPLE RESULTS

Field ID	Laboratory ID	Sample Date	Analyte	DQ	QC Comment
B-1	1307039-02A	06/27/2013	Cyclohexane	X7	none
B-2	1307039-10A	06/27/2013	Cyclohexane	X7	none
B-3	1307039-01A	06/27/2013	Cyclohexane	X7	none
B-4	1307039-09A	06/27/2013	Acetone	U	Field blank contamination (0.0062 mg/L)
B-4	1307039-09A	06/27/2013	Cyclohexane	X7	none
B-6	1307039-11A	06/27/2013	Cyclohexane	X7	none
B-7	1307039-06A	06/27/2013	Cyclohexane	X7	none
B-8	1307039-07A	06/27/2013	Acetone	U	Field blank contamination (0.0062 mg/L)
B-8	1307039-07A	06/27/2013	Cyclohexane	X7	none
d-45	1307039-03A	06/27/2013	Cyclohexane	X7	none
d-46	1307039-04A	06/27/2013	Cyclohexane	X7	none
d-47	1307039-08A	06/27/2013	Acetone	U	Field blank contamination (0.0062 mg/L)
d-47	1307039-08A	06/27/2013	Cyclohexane	X7	none
Dup-01	1307039-12A	06/27/2013	Cyclohexane	X7	none
Dup-02	1307039-21A	06/28/2013	Acetone	U	Field blank contamination (0.0069 mg/L)
Dup-02	1307039-21A	06/28/2013	Cyclohexane	X7	none
p-61	1307039-14A	06/28/2013	Cyclohexane	X7	none
p-62	1307039-13A	06/28/2013	Acetone	U	Field blank contamination (0.0069 mg/L)
p-62	1307039-13A	06/28/2013	Cyclohexane	X7	none
p-63	1307039-20A	06/28/2013	Acetone	U	Field blank contamination (0.0069 mg/L)
p-63	1307039-20A	06/28/2013	Cyclohexane	X7	none
p-64	1307039-19A	06/28/2013	Cyclohexane	X7	none
p-65	1307039-18A	06/28/2013	Acetone	U	Field blank contamination (0.0069 mg/L)
p-65	1307039-18A	06/28/2013	Cyclohexane	X7	none
p-66	1307039-17A	06/28/2013	Acetone	U	Field blank contamination (0.0069 mg/L)
p-66	1307039-17A	06/28/2013	Cyclohexane	X7	none
p-68	1307039-15A	06/28/2013	Acetone	U	Field blank contamination (0.0069 mg/L)
p-68	1307039-15A	06/28/2013	Cyclohexane	X7	none

Note: In addition to the above results, all detects between the SDL and MQL (i.e., results with a laboratory J-flag) should be considered estimated since the reported concentration is below the calibration range.

J Estimated data; The analyte was detected and identified. The associated numerical value (i.e., the reported sample concentration) is the approximate concentration of the analyte in the sample.

NJ Tentatively identified, estimated data; The analysis indicates the presence of the analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents its approximate concentration.

R Rejected data; The data is unusable. Serious QC deficiencies make it impossible to verify the absence or presence of this analyte.

U Potentially contaminated; The analyte was not detected >5x (10x for common contaminants) the level in an associated blank and thus should be considered not detected above the level of the associated numerical value (i.e., the reported sample concentration).

UJ Estimated data; The analyte was not detected above the reported sample detection limit (SDL). The numerical value of the SDL is estimated and may be inaccurate.

Field ID	Laboratory ID	Sample Date	Analyte	DQ	QC Comment

X7 The laboratory is not NELAC accredited under the Texas Laboratory Accreditation Program for this analyte in this matrix analyzed by this method. The TCEQ does not offer accreditation for this analyte, in this matrix, analyzed by this method.

H Bias in sample result is likely to be high

L Bias in sample result is likely to be low

NOTE: For multiple QC issues, the reviewer applied the most severe flag. (R >U >NJ >J >JL/JH for detects and R >UJ >UJL for non-detects)

TABLE 3
FORMOSA PLASTICS CORPORATION, TEXAS
SUPPLEMENTAL AOC CHARACTERIZATION – JUNE 2013

FIELD DUPLICATE SUMMARY

Sample Date	Original Sample	Duplicate Sample	Analyte	Original Result			Duplicate Result			Absolute Difference	2xMQL	RPD	Pass
06/27/2013	d-45	Dup-01	1,1,1-Trichloroethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,1,2,2-Tetrachloroethane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,1,2-Trichlor-1,2,2-trifluoroethane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,1,2-Trichloroethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,1-Dichloroethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,1-Dichloroethene	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,2,4-Trichlorobenzene	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,2-Dibromo-3-chloropropane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,2-Dibromoethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,2-Dichlorobenzene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,2-Dichloroethane	0.043		mg/L	0.041		mg/L	NA	0.002	4.8	yes
06/27/2013	d-45	Dup-01	1,2-Dichloropropane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,3-Dichlorobenzene	0.0003	U	mg/L	0.00041	J	mg/L	0.00011	0.002	NA	yes
06/27/2013	d-45	Dup-01	1,4-Dichlorobenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	2-Butanone	0.0004	U	mg/L	0.0004	U	mg/L	0	0.004	NA	yes
06/27/2013	d-45	Dup-01	2-Hexanone	0.0008	U	mg/L	0.0008	U	mg/L	0	0.004	NA	yes
06/27/2013	d-45	Dup-01	4-Methyl-2-pentanone	0.0006	U	mg/L	0.0006	U	mg/L	0	0.004	NA	yes
06/27/2013	d-45	Dup-01	Acetone	0.001	U	mg/L	0.001	U	mg/L	0	0.004	NA	yes
06/27/2013	d-45	Dup-01	Benzene	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Bromodichloromethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Bromoform	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Bromomethane	0.001	U	mg/L	0.001	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Carbon disulfide	0.0007	U	mg/L	0.0007	U	mg/L	0	0.004	NA	yes
06/27/2013	d-45	Dup-01	Carbon tetrachloride	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Chlorobenzene	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Chloroethane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Chloroform	0.0073		mg/L	0.0071		mg/L	NA	0.002	2.8	yes
06/27/2013	d-45	Dup-01	Chloromethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes

Sample Date	Original Sample	Duplicate Sample	Analyte	Original Result			Duplicate Result			Absolute Difference	2xMQL	RPD	Pass
06/27/2013	d-45	Dup-01	cis-1,2-Dichloroethene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	cis-1,3-Dichloropropene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Cyclohexane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Dibromochloromethane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Dichlorodifluoromethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Dichloromethane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.02	NA	yes
06/27/2013	d-45	Dup-01	Ethylbenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Isopropylbenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	m,p-Xylene	0.0006	U	mg/L	0.0006	U	mg/L	0	0.004	NA	yes
06/27/2013	d-45	Dup-01	Methyl acetate	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Methyl tert-butyl ether	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Methylcyclohexane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	o-Xylene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Styrene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Tetrachloroethene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Toluene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	trans-1,2-Dichloroethene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	trans-1,3-Dichloropropene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Trichloroethene	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Trichlorofluoromethane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Vinyl chloride	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/27/2013	d-45	Dup-01	Xylenes, Total	0.0009	U	mg/L	0.0009	U	mg/L	0	0.006	NA	yes
06/28/2013	p-68	Dup-02	1,1,1-Trichloroethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,1,2,2-Tetrachloroethane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,1,2-Trichlor-1,2,2-trifluoroethane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,1,2-Trichloroethane	0.0013		mg/L	0.0013		mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,1-Dichloroethane	0.032		mg/L	0.03		mg/L	NA	0.002	6.5	yes
06/28/2013	p-68	Dup-02	1,1-Dichloroethene	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,2,4-Trichlorobenzene	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,2-Dibromo-3-chloropropane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,2-Dibromoethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,2-Dichlorobenzene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,2-Dichloroethane	0.005		mg/L	0.0049		mg/L	0.0001	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,2-Dichloropropane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	1,3-Dichlorobenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes

Sample Date	Original Sample	Duplicate Sample	Analyte	Original Result			Duplicate Result			Absolute Difference	2xMQL	RPD	Pass
06/28/2013	p-68	Dup-02	1,4-Dichlorobenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	2-Butanone	0.0004	U	mg/L	0.0004	U	mg/L	0	0.004	NA	yes
06/28/2013	p-68	Dup-02	2-Hexanone	0.0008	U	mg/L	0.0008	U	mg/L	0	0.004	NA	yes
06/28/2013	p-68	Dup-02	4-Methyl-2-pentanone	0.0006	U	mg/L	0.0006	U	mg/L	0	0.004	NA	yes
06/28/2013	p-68	Dup-02	Acetone	0.0094		mg/L	0.01		mg/L	0.0006	0.004	NA	yes
06/28/2013	p-68	Dup-02	Benzene	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Bromodichloromethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Bromoform	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Bromomethane	0.001	U	mg/L	0.001	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Carbon disulfide	0.0007	U	mg/L	0.0007	U	mg/L	0	0.004	NA	yes
06/28/2013	p-68	Dup-02	Carbon tetrachloride	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Chlorobenzene	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Chloroethane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Chloroform	0.027		mg/L	0.027		mg/L	NA	0.002	0	yes
06/28/2013	p-68	Dup-02	Chloromethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	cis-1,2-Dichloroethene	0.011		mg/L	0.011		mg/L	NA	0.002	0	yes
06/28/2013	p-68	Dup-02	cis-1,3-Dichloropropene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Cyclohexane	0.0005	U	mg/L	0.0005	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Dibromochloromethane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Dichlorodifluoromethane	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Dichloromethane	0.0005	U	mg/L	0.00066	J	mg/L	0.00016	0.02	NA	yes
06/28/2013	p-68	Dup-02	Ethylbenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Isopropylbenzene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	m,p-Xylene	0.0006	U	mg/L	0.0006	U	mg/L	0	0.004	NA	yes
06/28/2013	p-68	Dup-02	Methyl acetate	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Methyl tert-butyl ether	0.0002	U	mg/L	0.0002	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Methylcyclohexane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	o-Xylene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Styrene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Tetrachloroethene	0.0014		mg/L	0.0013		mg/L	0.0001	0.002	NA	yes
06/28/2013	p-68	Dup-02	Toluene	0.0003	U	mg/L	0.0003	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	trans-1,2-Dichloroethene	0.0011		mg/L	0.00097	J	mg/L	0.00013	0.002	NA	yes
06/28/2013	p-68	Dup-02	trans-1,3-Dichloropropene	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes
06/28/2013	p-68	Dup-02	Trichloroethene	0.018		mg/L	0.017		mg/L	NA	0.002	5.7	yes
06/28/2013	p-68	Dup-02	Trichlorofluoromethane	0.0004	U	mg/L	0.0004	U	mg/L	0	0.002	NA	yes

Sample Date	Original Sample	Duplicate Sample	Analyte	Original Result			Duplicate Result			Absolute Difference	2xMQL	RPD	Pass
06/28/2013	p-68	Dup-02	Vinyl chloride	0.00078	J	mg/L	0.00067	J	mg/L	0.00011	0.002	NA	yes
06/28/2013	p-68	Dup-02	Xylenes, Total	0.0009	U	mg/L	0.0009	U	mg/L	0	0.006	NA	yes

Note: The RPD test (≤30%) applies if both results are greater than 5x MQL. Otherwise, the absolute difference test (≤ 2x MQL) applies.

ATTACHMENT 1

APPLICABLE PAGES OF THE
LABORATORY ACCREDITATION CERTIFICATE

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704231-13-12
Expiration Date:	4/30/2014
Issue Date:	5/7/2013

ALS Laboratory Group, Environmental Services Division (Houston, Texas)

10450 Stancliff Road, Suite 210
Houston, TX 77099-4341

These fields of accreditation supercede all previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Heptachlor	TX	7685	10178402
Heptachlor epoxide	TX	7690	10178402
Hexachlorobenzene	TX	6275	10178402
Methoxychlor	TX	7810	10178402
Mirex	TX	7870	10178402
Toxaphene (Chlorinated camphene)	TX	8250	10178402

Method EPA 8082

Analyte	**AB**	**Analyte ID**	**Method ID**
Aroclor-1016 (PCB-1016)	TX	8880	10179201
Aroclor-1221 (PCB-1221)	TX	8885	10179201
Aroclor-1232 (PCB-1232)	TX	8890	10179201
Aroclor-1242 (PCB-1242)	TX	8895	10179201
Aroclor-1248 (PCB-1248)	TX	8900	10179201
Aroclor-1254 (PCB-1254)	TX	8905	10179201
Aroclor-1260 (PCB-1260)	TX	8910	10179201
PCBs (total)	TX	8870	10179201

Method EPA 8151

Analyte	**AB**	**Analyte ID**	**Method ID**
2,4,5-T	TX	8655	10183003
2,4-D	TX	8545	10183003
2,4-DB	TX	8560	10183003
Dalapon	TX	8555	10183003
Dicamba	TX	8595	10183003
Dichloroprop (Dichlorprop, Weedone)	TX	8605	10183003
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10183003
MCPA	TX	7775	10183003
MCPP	TX	7780	10183003
Silvex (2,4,5-TP)	TX	8650	10183003

Method EPA 8260

Analyte	**AB**	**Analyte ID**	**Method ID**
1,1,1,2-Tetrachloroethane	TX	5105	10184404

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Matrix: *Non-Potable Water*

1,1,1-Trichloroethane	TX	5160	10184404
1,1,2,2-Tetrachloroethane	TX	5110	10184404
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	TX	5195	10184404
1,1,2-Trichloroethane	TX	5165	10184404
1,1-Dichloroethane	TX	4630	10184404
1,1-Dichloroethylene	TX	4640	10184404
1,1-Dichloropropene	TX	4670	10184404
1,2,3-Trichlorobenzene	TX	5150	10184404
1,2,3-Trichloropropane	TX	5180	10184404
1,2,4-Trichlorobenzene	TX	5155	10184404
1,2,4-Trimethylbenzene	TX	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184404
1,2-Dichlorobenzene	TX	4610	10184404
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184404
1,2-Dichloropropane	TX	4655	10184404
1,3,5-Trimethylbenzene	TX	5215	10184404
1,3-Dichlorobenzene	TX	4615	10184404
1,3-Dichloropropane	TX	4660	10184404
1,4-Dichlorobenzene	TX	4620	10184404
1,4-Dioxane (1,4-Diethyleneoxide)	TX	4735	10184404
1-Chlorohexane	TX	4510	10184404
1-Propanol	TX	5060	10184404
2,2-Dichloropropane	TX	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184404
2-Chloroethyl vinyl ether	TX	4500	10184404
2-Chlorotoluene	TX	4535	10184404
2-Hexanone (MBK)	TX	4860	10184404
2-Pentanone	TX	5045	10184404
2-Propanol	TX	5065	10184404

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Matrix: *Non-Potable Water*

4-Chlorotoluene	TX	4540	10184404
4-Isopropyltoluene (p-Cymene)	TX	4915	10184404
4-Methyl-2-pentanone (MIBK)	TX	4995	10184404
Acetone (2-Propanone)	TX	4315	10184404
Acetonitrile	TX	4320	10184404
Acrolein (Propenal)	TX	4325	10184404
Acrylonitrile	TX	4340	10184404
Allyl alcohol	TX	4350	10184404
Allyl chloride (3-Chloropropene)	TX	4355	10184404
Benzene	TX	4375	10184404
Benzyl chloride	TX	5635	10184404
Bromobenzene	TX	4385	10184404
Bromochloromethane	TX	4390	10184404
Bromodichloromethane	TX	4395	10184404
Bromoform	TX	4400	10184404
Carbon disulfide	TX	4450	10184404
Carbon tetrachloride	TX	4455	10184404
Chlorobenzene	TX	4475	10184404
Chlorodibromomethane	TX	4575	10184404
Chloroethane (Ethyl chloride)	TX	4485	10184404
Chloroform	TX	4505	10184404
Chloroprene (2-Chloro-1,3-butadiene)	TX	4525	10184404
cis-1,2-Dichloroethylene	TX	4645	10184404
cis-1,3-Dichloropropene	TX	4680	10184404
Dibromofluoromethane	TX	4590	10184404
Dibromomethane (Methylene bromide)	TX	4595	10184404
Dichlorodifluoromethane (Freon-12)	TX	4625	10184404
Diethyl ether	TX	4725	10184404
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	TX	4745	10184404
Ethanol	TX	4750	10184404

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Matrix: ***Non-Potable Water***

Ethyl acetate	TX	4755	10184404
Ethyl methacrylate	TX	4810	10184404
Ethylbenzene	TX	4765	10184404
Ethylene oxide	TX	4795	10184404
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	TX	4770	10184404
Hexachlorobutadiene	TX	4835	10184404
Iodomethane (Methyl iodide)	TX	4870	10184404
Isobutyl alcohol (2-Methyl-1-propanol)	TX	4875	10184404
Isopropyl ether	TX	4905	10184404
Isopropylbenzene (Cumene)	TX	4900	10184404
m+p-xylene	TX	5240	10184404
Methacrylonitrile	TX	4925	10184404
Methyl acetate	TX	4940	10184404
Methyl acrylate	TX	4945	10184404
Methyl bromide (Bromomethane)	TX	4950	10184404
Methyl chloride (Chloromethane)	TX	4960	10184404
Methyl methacrylate	TX	4990	10184404
Methyl tert-butyl ether (MTBE)	TX	5000	10184404
Methylcyclohexane	TX	4965	10184404
Methylene chloride (Dichloromethane)	TX	4975	10184404
Naphthalene	TX	5005	10184404
n-Butyl alcohol (1-Butanol, n-Butanol)	TX	4425	10184404
n-Butylbenzene	TX	4435	10184404
n-Propylbenzene	TX	5090	10184404
o-Xylene	TX	5250	10184404
Pentachloroethane	TX	5035	10184404
Propionitrile (Ethyl cyanide)	TX	5080	10184404
Pyridine	TX	5095	10184404
sec-Butylbenzene	TX	4440	10184404
Styrene	TX	5100	10184404

Texas Commission on Environmental Quality

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10450 Stancliff Road, Suite 210
Houston, TX 77099-4341 **Issue Date:** 5/7/2013

These fields of accreditation supercede all previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

T-amylmethylether (TAME)	TX	4370	10184404
tert-Butyl alcohol	TX	4420	10184404
tert-Butylbenzene	TX	4445	10184404
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184404
Toluene	TX	5140	10184404
trans-1,2-Dichloroethylene	TX	4700	10184404
trans-1,3-Dichloropropylene	TX	4685	10184404
trans-1,4-Dichloro-2-butene	TX	4605	10184404
Trichloroethene (Trichloroethylene)	TX	5170	10184404
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184404
Vinyl acetate	TX	5225	10184404
Vinyl chloride	TX	5235	10184404
Xylene (total)	TX	5260	10184404

Method EPA 8270

Analyte	**AB**	**Analyte ID**	**Method ID**
1,2,4,5-Tetrachlorobenzene	TX	6715	10185203
1,2,4-Trichlorobenzene	TX	5155	10185203
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10185203
1,2-Dichlorobenzene	TX	4610	10185203
1,2-Dinitrobenzene	TX	6155	10185203
1,2-Diphenylhydrazine	TX	6220	10185203
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10185203
1,3-Dichlorobenzene	TX	4615	10185203
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10185203
1,4-Dichlorobenzene	TX	4620	10185203
1,4-Dinitrobenzene	TX	6165	10185203
1,4-Naphthoquinone	TX	6420	10185203
1,4-Phenylenediamine	TX	6630	10185203
1-Chloronaphthalene	TX	5790	10185203
1-Naphthylamine	TX	6425	10185203

TETRA TECH

Performance Monitoring Plan

Prepared for:

Formosa Plastics Corporation – Texas

Point Comfort, Texas

Prepared by:

Tetra Tech

8911 North Capital of TX Highway
Building 2, Suite 2310
Austin, TX 78759
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Tetra Tech Project No. 114-021550

March 28, 2014

complex world CLEAR SOLUTIONS™

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

March 15, 2016

Mr. Rick Crabtree and Mr. Matt Brogger
Formosa Plastics Corporation, Texas
P.O. Box 700
Point Comfort, Texas 77978

RE: Groundwater Monitoring Reporting and the March 28, 2014 Performance Monitoring Plan (PMP) from the Administrative Order on Consent (AOC) Docket #VI – 001(h)-90-H

Dear Mr. Crabtree and Mr. Brogger,

The purpose of this letter is to address issues with groundwater monitoring reporting and the PMP submitted March 28, 2014.

In reviewing the groundwater monitoring quarterly reports of 2015, the EPA has made observations and is requesting the following improvements to data evaluation and presentation for future groundwater monitoring reports, and to the groundwater monitoring well design from the PMP:

First, is a needed change to the method used to measure dense non-aqueous phase liquids (DNAPL). There are new techniques to employ to obtain information about whether DNAPL is present in the groundwater wells - such as the hydrophobic covers over liners or hydrophobic dyes used for a visual detection of the presence or absence of DNAPL. Both of these techniques are described in the ITRC guidance, "Integrated DNAPL Site Characterization and Tools Section" (May 2015). Please make a change to the evaluation of the presence of DNAPL and record the results in Table 2 "DNAPL Measurement Record" for all future groundwater monitoring reports.

Secondly, the PCLE maps in the quarterly reports need to adopt color-coding to depict concentrations for EDC. Also, PCLE maps for vinyl chloride need to be presented in each report, also with color-coding representing concentration levels. Vinyl chloride is a major daughter product from the natural break-down of tetrachloroethene (PCE) and trichloroethene. The 2015 groundwater monitoring data show increasing levels of vinyl chloride in the C zone at the VCM plant. [Well D-13 and D-14 screened at intervals 96 '– 106' and 106' – 116' respectively.] The concentration of vinyl chloride in well D-13 in 2015 was 0.25 parts per million (ppm), or converted to parts per billion (ppb) is equal to 250 ppb. The groundwater gradient in the C zone is to the east toward potential receptors, therefore vinyl chloride needs to be monitored and mapped, since the drinking water standard for vinyl chloride is 2 ppb. The data reveals that the source material for vinyl chloride has essentially moved from the A zone (which is showing a decreasing trend) to the lower B zone (which has concentrations of 9700 ppb.) The 2014 Performance Monitoring Plan (Section 2.2.3 Potential New Zone C Wells) describes two new wells to further define the eastern boundary of the impacts seen in well D-45 at the former Wastewater Treatment Plant [3.4 ppb vinyl chloride in 4th quarter 2015]. The EPA considers the installation of the

monitoring well denoted D-49 in the PMP a priority for FPC. As such, the EPA expects FPC to submit a letter with a schedule for completion of this task (in lieu of deferring this activity to the schedule in the Post Closure Order as described in the Section 1.0 Introduction of the March 28, 2014 PMP).

Lastly, in our past meetings with TCEQ a potential recovery well for Zone C was discussed. Based on this groundwater review, the EPA is convinced that a recovery well in the lower B zone located at the VCM plant near well D-11 would be appropriate at this time. Additionally, as recommended in Section 7.4 of the 2015 4th Quarter Groundwater Monitoring report, well RD-3 redevelopment needs to be a priority for FPC. The EPA expects FPC to submit a letter in 30 days describing the location of a new recovery well for the lower B zone and a schedule for completion of the recovery well installation and RD-3 redevelopment.

If you have any questions or concerns, please feel free to contact me at 214.665.8385.

Nancy Fagan

Nancy Fagan

Project Coordinator

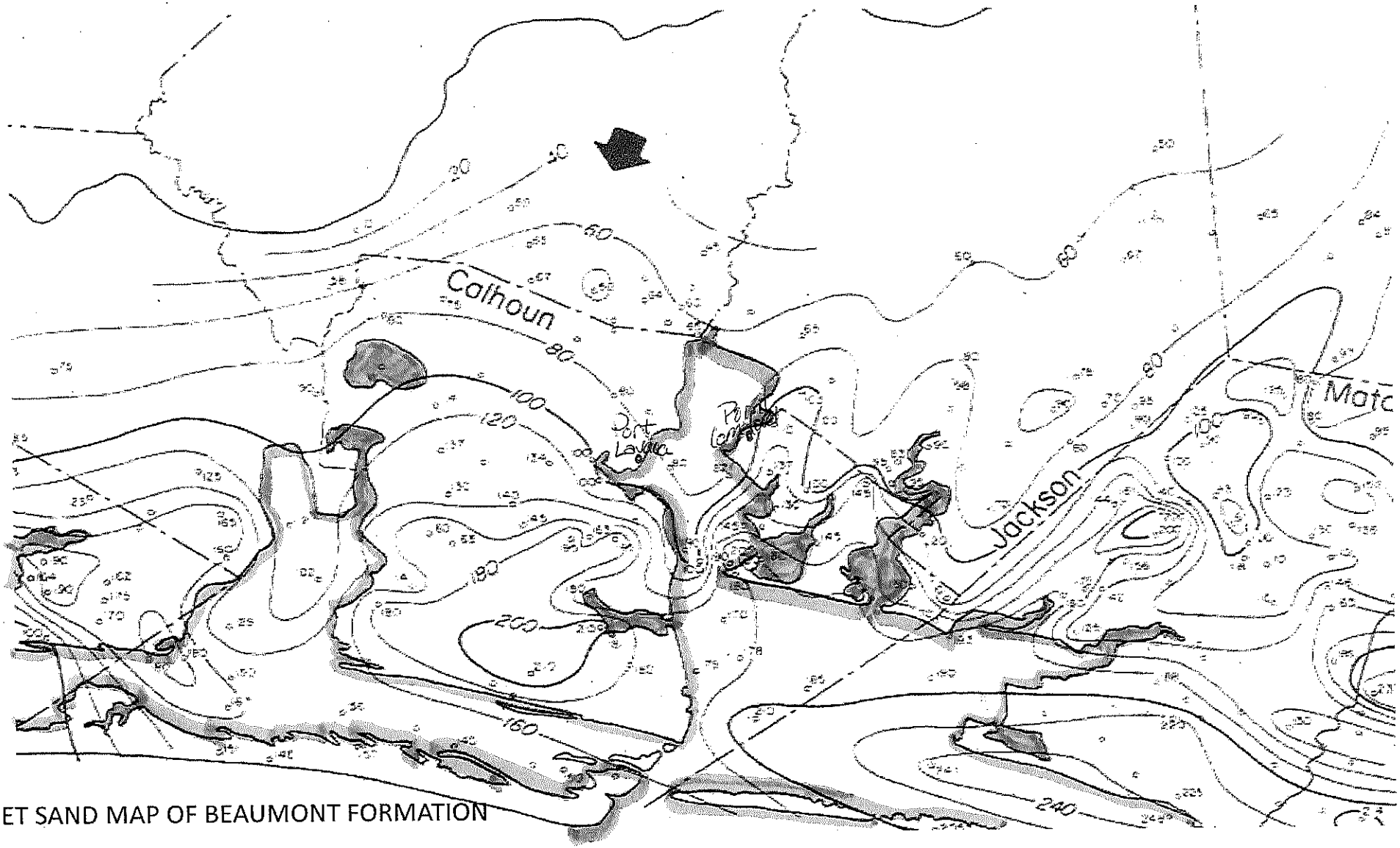
Attachment

cc: Hector Gonzales, Section Manager - Waste
TCEQ Region 14
6300 Ocean Drive, Suite 1200
Corpus Christi, TX 78412

Ms. Maureen Hatfield, MC-127
TCEQ
P.O. Box 13087
Austin, TX 78711-3087

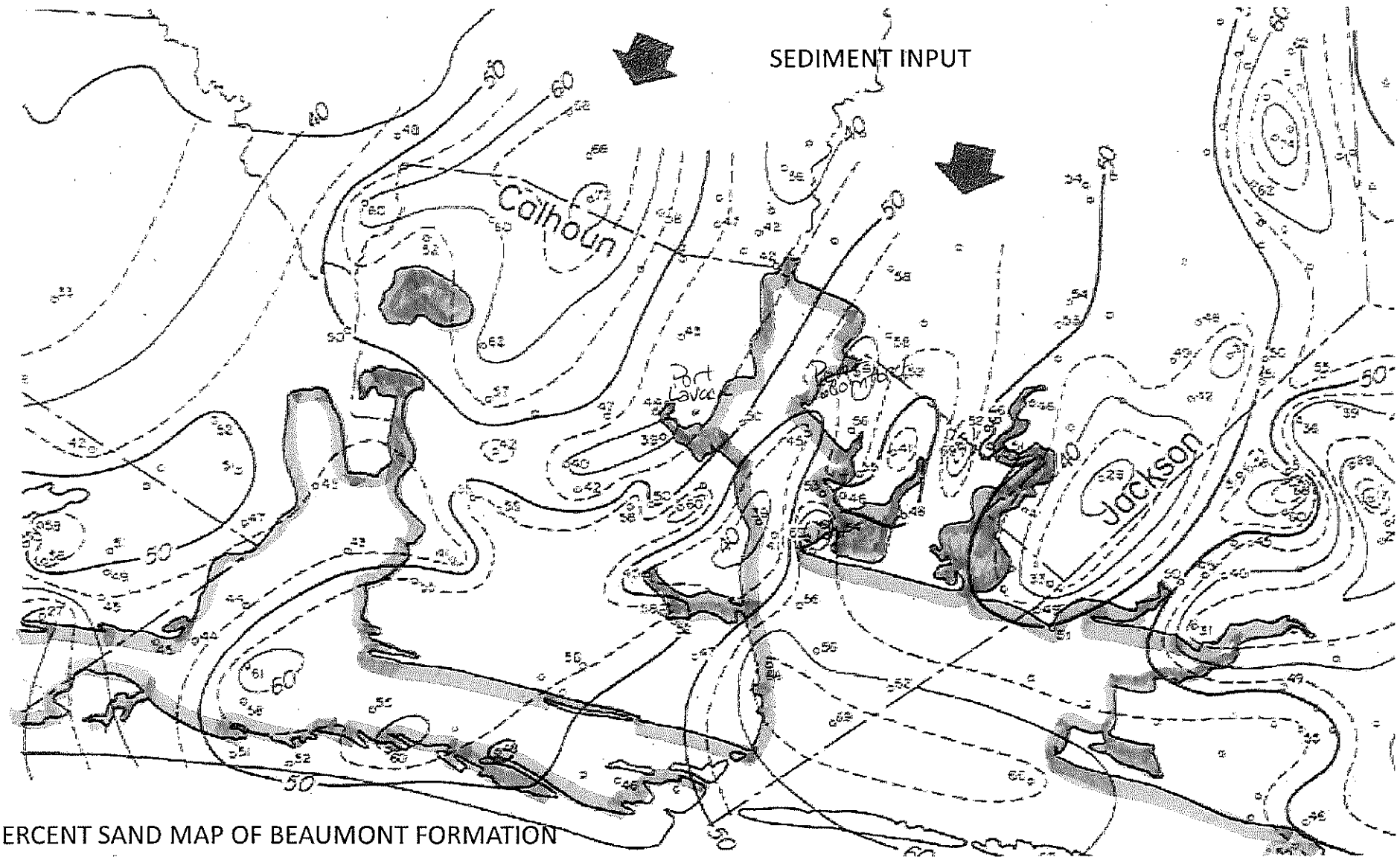
BEAUMONT FORMATION IN CALHOUN COUNTY

UPPER TERTIARY AND QUATERNARY DEPOSITIONAL SYSTEMS,
CENTRAL COASTAL PLAIN, TEXAS -
REGIONAL GEOLOGY OF THE COASTAL AQUIFER..
BEG 1981 REPORT ON INVESTIGATIONS #108



NET SAND MAP OF BEAUMONT FORMATION

at FPC ~ 100'



PERCENT SAND MAP OF BEAUMONT FORMATION

At FPC ~50% SAND

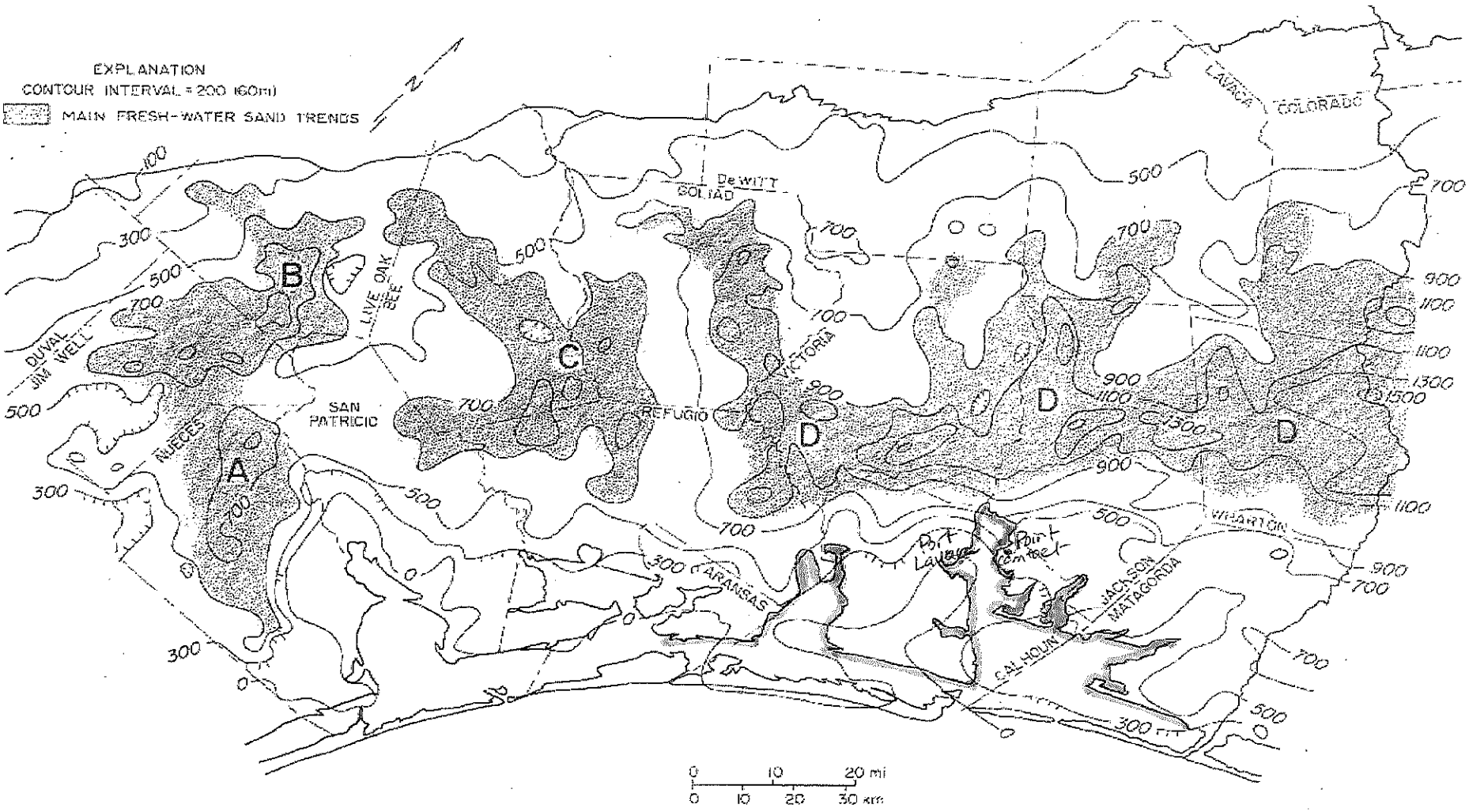


Figure 38. Main fresh-water sand trends of the coastal aquifer. See page 66 for discussion of areas A to D.

Main freshwater sands are to north of FPC

700+ to 900+

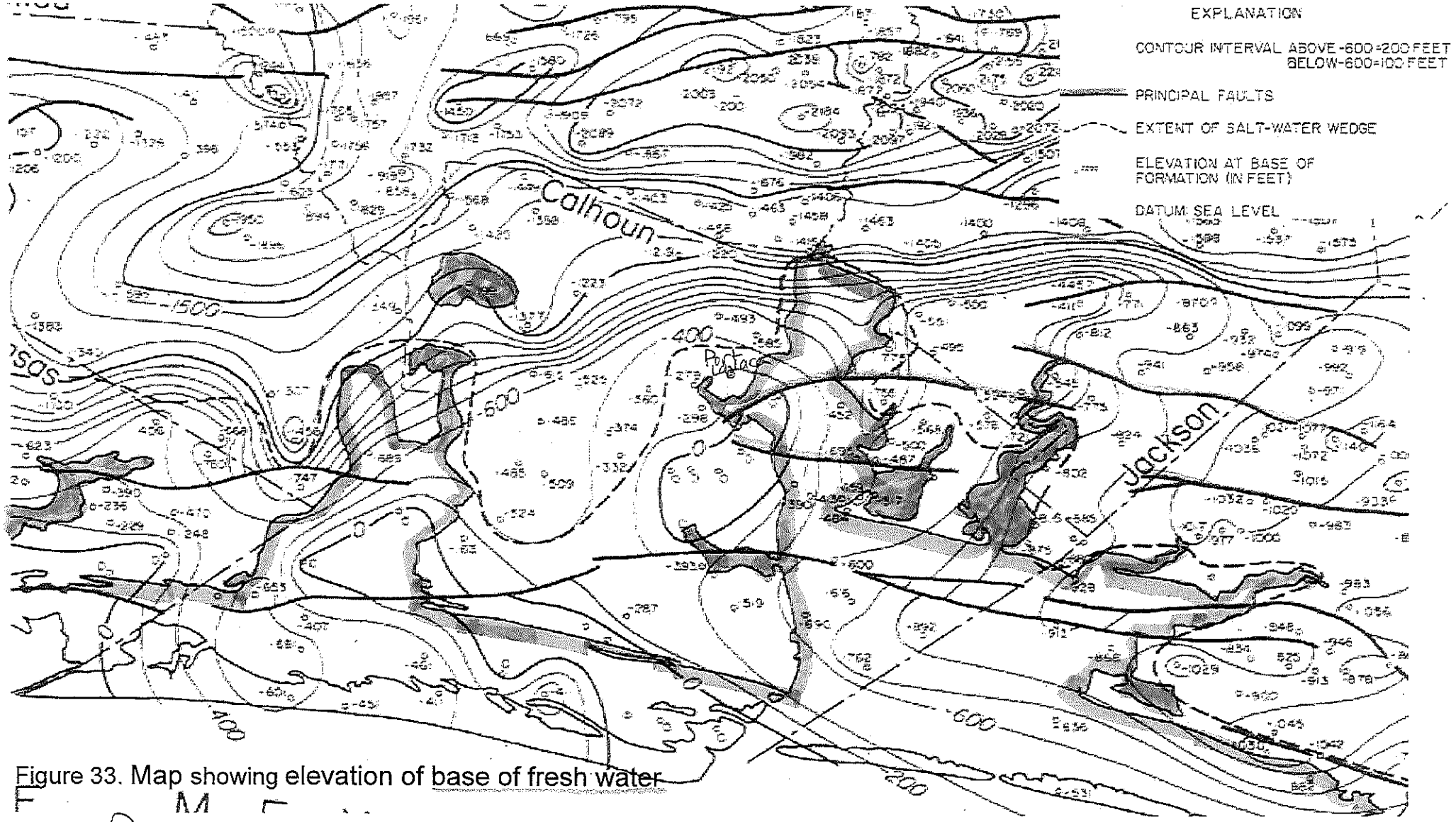
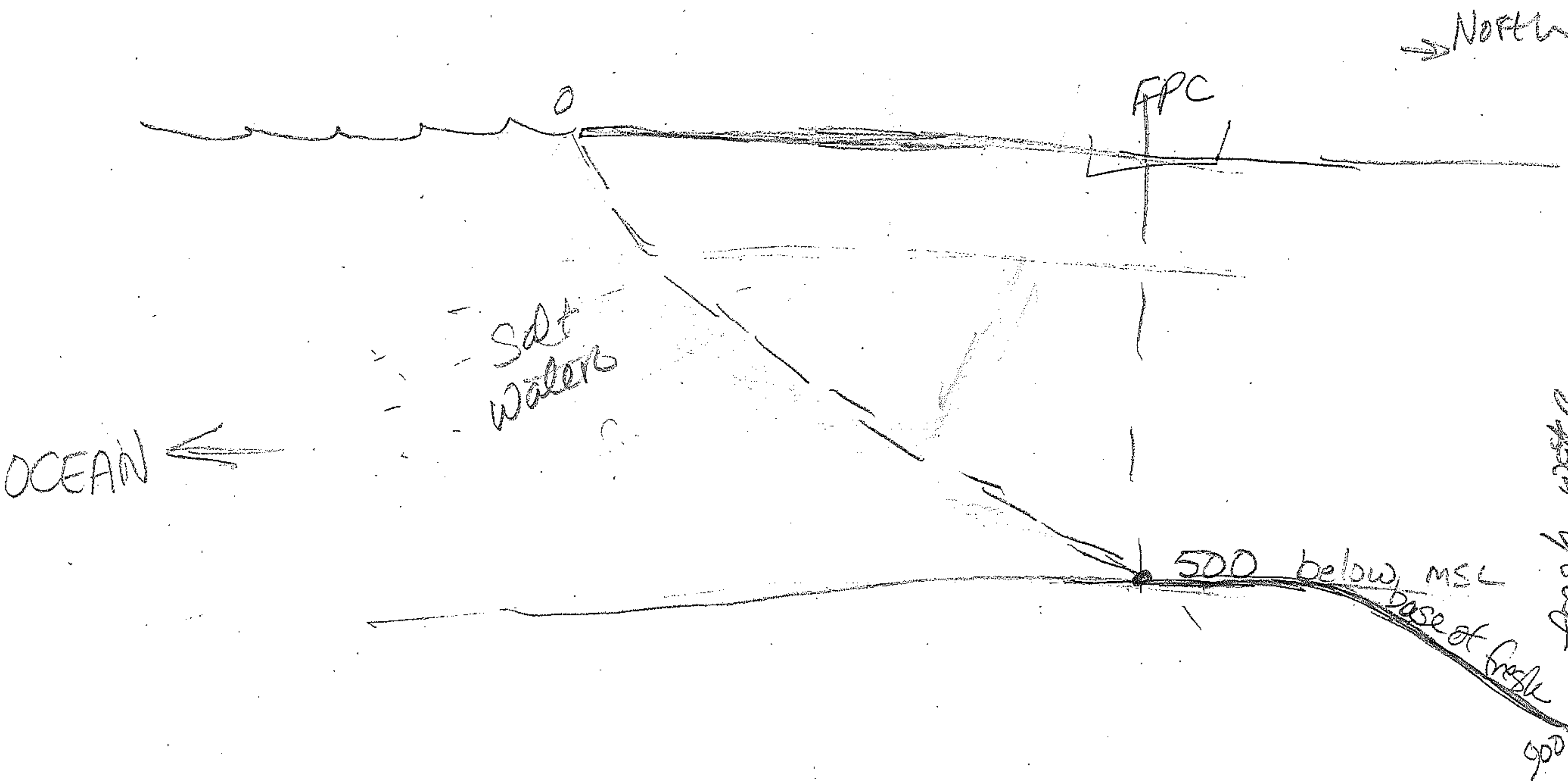
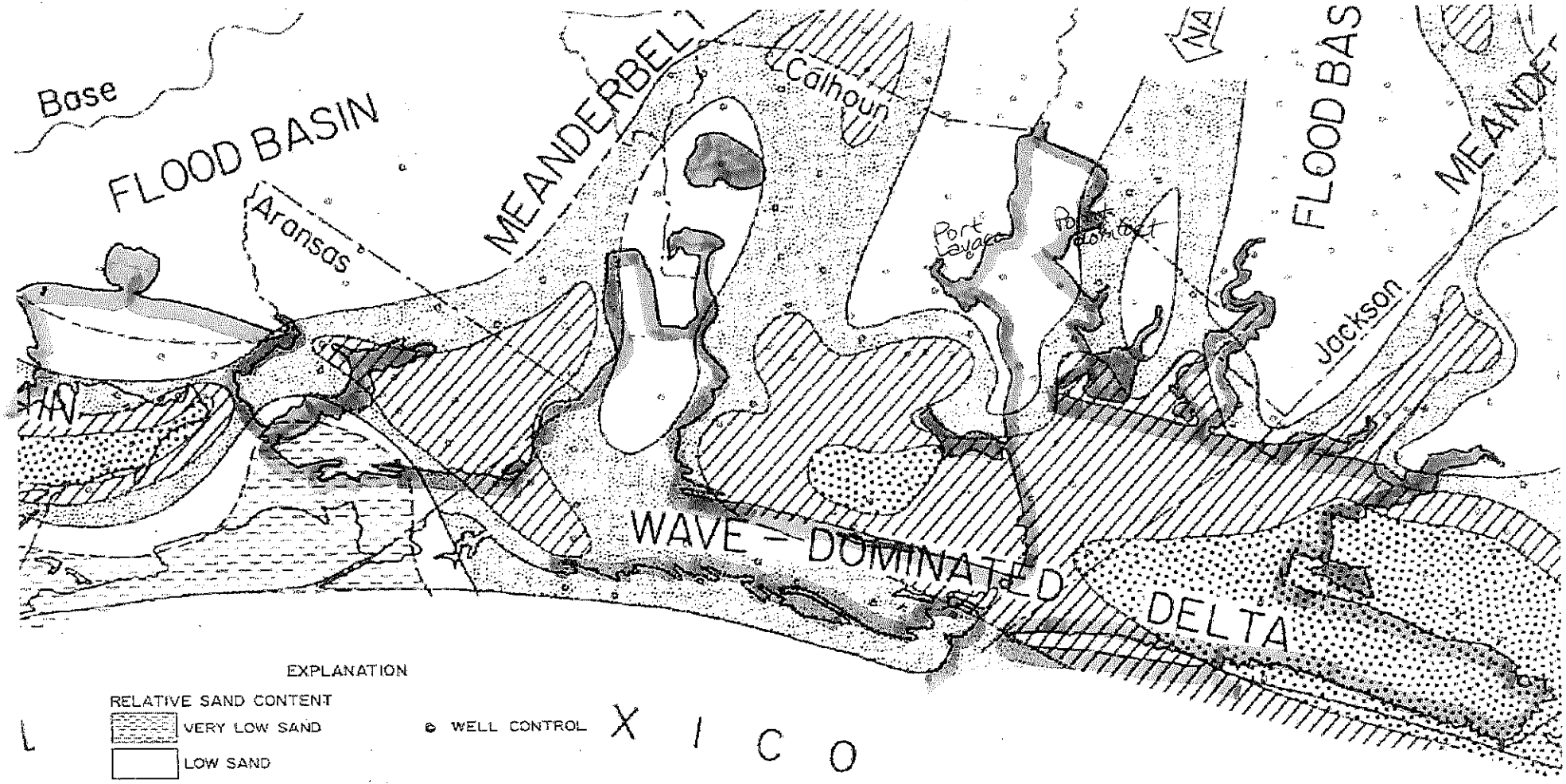


Figure 33. Map showing elevation of base of fresh water

Potential for SALT WATER INTRUSION ALONG GROWTH FAULT (over)


North
FPC
0
Salt water
OCEAN
500 below MSL
base of fresh
fresh water
900



DEPOSITIONAL SYSTEM MAP Matches with 50% sand map

Performance Monitoring Plan

Prepared for:

Formosa Plastics Corporation - Texas

Point Comfort, Texas

Prepared by:

Tetra Tech

8911 North Capital of TX Highway
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Austin, TX 78759
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Tetra Tech Project No. 114-021550

March 28, 2014

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LIST OF APPENDICES

LIST OF ACRONYMS

AOC	Area of Concern
ARFI	Accelerated RFI
CAO	Corrective Action Objective
CAP	Corrective Action Plan
CAS	Corrective Action Strategy
CCTM	Current Conditions Technical Memorandum
CMS	Corrective Measures Study
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CQA	Construction Quality Assurance
CSM	Conceptual Site Model
C_{sat}	Soil Saturation Limit
DOT	Department of Transportation
DQO	Data Quality Objectives
EDC	1,2-Dichloroethane or Ethylene Dichloride
EPA	U.S. Environmental Protection Agency
FM	Farm to Market Road
FPC-TX	Formosa Plastics Corporation, Texas
FSP	Field Sampling Plan
HASP	Health and Safety Plan
HCl	Hydrochloric Acid
IM	Interim Measures
NAPL	Non-Aqueous Phase Liquid
NFA	No Further Action
NHD	National Hydrography Dataset
NWI	National Wetland Inventory
PCE	Tetrachloroethene
PCL	Protective Concentration Level
PMZ	Plume Management Zone
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RMP	Risk Management Plan
SRFI	Supplemental RFI
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TRRP	Texas Risk Reduction Program
VCM	Vinyl Chloride Monomer
VOC	Volatile Organic Compounds
WWTP	Waste Water Treatment Plant
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene

1.0 INTRODUCTION

In accordance with the U.S. Environmental Protection Agency (EPA) Administrative Order on Consent with Corrective Action Plan (CAP) dated February 27, 1991, as amended on June 12, 2012 (Amendment No. 2) (EPA Docket No. VI-001(h)-90-H; EPA I.D. No. TXT490011293), Formosa Plastics Corporation, Texas (FPC-TX) has undertaken measures to characterize and remediate soil and groundwater affected by volatile organic compounds (VOCs) at the Point Comfort facility.

Amendment No. 2 to the 3008(h) Administrative Order includes a requirement to prepare both a Draft and Final Performance Monitoring Plan (PMP) for Corrective Action Objective 1, including a revised GWSAP. The primary purpose of the Performance Monitoring Plan is to describe groundwater monitoring requirements to ensure compliance with Corrective Action Objective 1. Corrective Action Objectives (CAOs) were presented in EPA's Performance Based Remedy Decision document (EPA, 2009), finalized in the Response to Comments/Final Decision Document (EPA, 2010) and discussed in detail in the Risk Management Plan (RMP) (Tetra Tech, 2010) and the Final AOC Characterization Work Plan (Tetra Tech, 2012).

1.1 Agency Directives on the Draft Performance Monitoring Plan

The Draft PMP (Tetra Tech, 2013) was submitted on October 31, 2013. FPC-TX has provided TCEQ an application for Post-Closure Order (PCO), thus, corrective action related activities are currently transitioning from EPA to TCEQ. As a result, the agencies provided joint comments on the PMP via letter dated February 28, 2014. EPA's cover letter and EPA and TCEQ's joint comments on the Draft PMP are included for reference in Appendix C.

Per EPA's February 28, 2014 cover letter, TCEQ and EPA agree that information from the PMP will be incorporated into the PCO. To meet the requirements of Amendment No. 2 to the 3008(h) Administrative Order, EPA's letter directs FPC-TX to do the following:

- Submit a Final Performance Monitoring Plan with revisions to Section 3 and Section 4.

The current document incorporates EPA's comments as directed and is considered the Final PMP. EPA further directs FPC-TX to defer other revisions to the PMP as follows:

- Revise information provided in Section 1 and Section 2 of the PMP following completion and TCEQ approval of the Affected Property Assessment Report (APAR) conducted under the PCO.

- Implement recommendations and modifications from Section1 and Section 2 of the PMP according to the schedule included in the PCO.

- Revise Appendix A, Groundwater Sampling and Analysis Plan, and Appendix B, Quality Assurance Project Plan, and incorporate the current PMP comments into an updated Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) and submitted to TCEQ according to a schedule included in the PCO.

Although not documented in the February 28, 2014 cover letter and PMP comments, based on further discussion with the agencies FPC-TX, EPA, and TCEQ agree to the following:

- Section 3 of the PMP, which describes the performance monitoring plan for CAO 1, will be updated under the PCO following completion of the APAR and presented as a Plume Management Zone (PMZ) monitoring plan in the appropriate Response Action Plan (RAP).

- Section 4 of the PMP, which describes sediment and surface water sampling of Cox Creek in support of CAO 4, will be implemented in accordance with the schedule included in the PCO.

- Formosa will continue quarterly groundwater monitoring in the pre-1990 area until the PMZ monitoring plan is approved, or TCEQ approves a modification to the current monitoring plan. Currently, FPC-TX samples all wells in the 1st Quarter, and samples a reduced set of wells in the remaining three quarters. The reduced set of wells are selected based on the following criteria:
    - Well is located at the down-gradient property boundary;
    - Well is located between the leading edge of the plume and the down gradient boundary; or
    - Well is determined to be important for monitoring vertical migration.

1.2 Final Performance Monitoring Plan

As noted above, EPA directed FPC-TX to submit a Final Performance Monitoring Plan with revisions to Sections 3 and 4 and EPA will defer other revisions. The current document is the Final Performance Monitoring Plan submitted in accordance with Amendment No. 2 to the 3008(h) Administrative Order on Consent.

As described in Section 1.1, assessment of existing monitoring wells (Section 2), groundwater monitoring in support of CAO 1 (Section 3), sediment and surface water monitoring of Cox Creek in support of CAO 4 (Section 4), the Groundwater Sampling and Analysis Plan (Appendix A), and the Quality Assurance Project Plan (Appendix B) will all be updated and implemented as part of the Post-Closure Order and EPA and TCEQ's comments on the Draft PMP will be incorporated into those revisions under the PCO. In addition, the recently completed Updated Risk Management Plan (RMP) (Tetra Tech, 2014) includes a detailed update of the conceptual site model based on the newest data collected during the AOC Characterization investigation completed in late 2012 and the supplemental AOC Characterization investigation completed in mid-2013. The Updated RMP modified the conceptual site model relative to the understanding of groundwater flow and contaminant pathways, and subsequently will result in a modified approach to design and implementation of the groundwater performance monitoring plan.

As a result of EPA's deferral of key elements of the PMP to the PCO, and the modifications of the current conceptual site model as presented in the Updated RMP, the current document (the Final Performance Monitoring Plan) should not be used to guide monitoring activities conducted at the FPC-TX facility.

2.0 EXISTING WELL EVALUATION

***INTRODUCTION TO FINAL PMP SECTION 2:** As discussed in Section 1.1, EPA and TCEQ provided comments on Section 2 of the Draft PMP, but directed FPC-TX to defer revisions to Section 2 to the Post Closure Order. As directed, FPC-TX has not modified Section 2 and the following text is unchanged from the October 31, 2013 Draft PMP.*

As directed by EPA, this section evaluates the existing monitoring well network to identify existing wells that may no longer be usable or necessary, propose additional well locations required to adequately characterize the extent of impacted groundwater, and propose additional well locations necessary to adequately monitor conditions along the down-gradient facility boundaries. Following completion of the RMP, additional wells may be proposed for P&A, and some proposed new well locations may be modified.

2.1 Review and Evaluation of Existing Monitoring Wells

There are currently 104 monitoring wells and 8 active recovery wells in the pre-1990 area at the facility. The majority of the wells were installed as part of the various phases of the RFI, and many of the wells were installed as early as 1991 and are over 20 years old. Over time, some of these wells have degraded and are no longer usable. Others have accumulated sediments and should be redeveloped. Some wells are located in areas that do not provide meaningful data based on the current conceptual site model.

Tetra Tech typically completes a basic well inspection during the quarterly monitoring events. In addition, on October 17 and 18, 2013, Tetra Tech measured the total depth of each monitoring well. These values were compared to the original reported monitoring well depths as recorded in the boring logs. Table 1 summarizes each of the pre-1990 area monitoring wells. An attempt was made to categorize all of the wells as follows:

1. Well appears to be in good shape
2. Well requires redevelopment (silt removal)
3. Well is not needed in current location and will be plugged and abandoned

4. Well is needed in current general vicinity, but current well is damaged and should be plugged and abandoned and replaced.

2.1.1 Zone P Wells

There are currently five monitoring wells that are considered to be screened in Zone P. Zone P is described in the 2010 RMP as a lateral discontinuous perched zone present primarily in the western portion of the VCM Area. The current conceptual model being developed in the updated RMP considers Zone P to simply be a shallow manifestation of the Zone A package, with localized permeable lenses and associated perched water. The five wells present in Zone P appear to be in reasonably good condition and there are no plans to eliminate or add to these wells at this time. Upon completion of the RMP, these wells will be reevaluated and some may be considered for possible P&A.

2.1.2 Zone A Wells

There are 49 monitoring wells screened in Zone A. Based on the total depth measurements presented in Table 1, the majority of these wells appear to be in reasonable condition. Groundwater monitoring is conducted at the site using low flow sampling techniques. This reduces the overall volume of purge water generated; however, water in the wells is not fully evacuated and thus silt can accumulate in the wells. Some wells should be redeveloped to remove accumulated sediments. Wells where more than one-foot of silt has accumulated are summarized below.

- P-3: Monitoring well P-3 should be redeveloped and carefully inspected. This is one of the original wells installed in 1990 and is located in the primary VCM area Zone A groundwater PCLE zone, with EDC concentrations in excess of 100 ppm reported as recently as 2011. The well is a PVC well. Although the available information indicates the well is still in good condition, it may be necessary to replace this well with a stainless steel well as some point in the future.

- P-8: Monitoring well P-8 is upgradient of the WWTP are Zone A plume located in the vicinity of the Equalization Basin. There is no evidence of impacts at this location and no need to continue sampling this well in the future; however, water level measurements should continue to be collected at P-8 to provide a control point for understanding the

Zone A potentiometric surface. Based on this intended use, there is no need to redevelop this well.

- P-10: Low concentrations of EDC have been sporadically detected in monitoring well P-10 over the past 5 years. Based on the well measurements, silt has accumulated in only approximately 20% of the screened interval; however, this well should be redeveloped to ensure representative samples can be obtained.

- P-11: Monitoring well P-11 is an up-gradient well. There is no evidence of impacts at this location and no need to continue sampling this well in the future; however, water level measurements should continue to be collected at this well as this is a key upgradient point for understanding the Zone A potentiometric surface. Based on this intended use, there is no need to redevelop the well.

- P-42 and P-43: Monitoring wells P-42 and P-43 are upgradient of the primary of VCM area Zone A groundwater PCLE zone. These wells were constructed with a sump which appears to have filled with silt. There is no evidence of impacts at these locations and no need to continue sampling these wells in the future; however, water level measurements should continue to be collected at these wells as control points for understanding the Zone A potentiometric surface. Based on this intended use, there is no need to redevelop these wells.

- P-50 and P-55: Although the silt accumulated in monitoring wells P-50 and P-55 appears to be primarily contained in the sump, these wells are currently considered critical facility boundary control wells and it may be appropriate to redevelop these wells to ensure representative samples can be obtained. COCs are present in P-50 at concentrations less than PCLs, thus P-50 is an important well to continue to sample. COCs have never been detected in P-55, and the updated RMP may indicate that there is no need to continue to monitor P-55.

- P-56: Groundwater samples collected at monitoring well P-56 are typically the most highly impacted samples at the site. This well is regularly checked for DNAPL, but DNAPL has never been detected in the well. Based on the well measurements, silt has accumulated in only the sump and is not blocking the screened interval; however, given

the high COC concentrations present at this location, this well should be redeveloped to ensure that DNAPL measurements are accurate.

- P-63 and P-65: New monitoring wells P-63 and P-65, installed in June 2013, each appear to have a couple of feet of sediment indicating that these wells may need additional development.

In addition to the silting issues summarized above, issues associated with some of the wells have been noted in the quarterly reports. Most recently, possibly associated with the drought, the pads at several wells have been noted to be cracked or unstable. The well pads at P-8 and P-55 are shifting and reportedly wobble. The well pad at P-38 appears to have a 2-inch crack through the middle of the pad. FPC-TX will continue to inspect all the wells on a quarterly basis and take corrective action if the wells appear to be compromised.

2.1.3 Zone B Wells

There are 22 monitoring wells screened in Zone B, based on the current site model. The conceptual site model is being updated in the RMP currently being prepared and some Zone C wells may be reclassified as Zone B wells. For example, although the analysis is not yet complete, it appears the Zone C monitoring wells D-4, D-10, and RD-2 may actually be located in a deeper lens of Zone B. Based on the total depth measurements presented in Table 1, several wells may need redeveloped. In addition, several Zone B wells may have failed and should be plugged and abandoned. Problematic Zone B wells are summarized below.

- B-2 and B-7: New monitoring wells B-2 and B-7, installed in June 2013, each appear to have accumulated approximately a foot of sediment indicating that these wells may need additional development.

- P-12: Monitoring well P-12 is located in the VCM Area Zone B plume and groundwater samples from the well have consistently been contaminated, although the concentration in the well has decreased dramatically since 1999. This is one of the original wells installed in 1990 and is a PVC well. Although the information presented in Table 1 indicates the well is still in good condition, there were issues associated with this well reported in the XX quarter. It may be necessary to replace this well with a stainless steel

well as some point in the future. It would be difficult to replace this well at the current location due to facility expansion in the vicinity of the well.

- P-16 and P-17: The two wells, located near the sludge drying beds in the former WWTP Area, appear to have failed. The casing is separated a few feet below grade. This may be associated with drought conditions and shifting grounds. These two wells should be plugged and abandoned. New monitoring well B-3 was installed in the general vicinity of these wells in June 2013, and is appropriately located to replace P-16 and P-17.

- P-21: Monitoring well P-21 is located in a key location in the VCM area. P-21 is nested with Zone A monitoring well P-22 at a location where it appears that there is little or no separation between Zone A and B. Both P-21 and P-22 were historically contaminated although recent sample results reported for P-22 have been below the detection limit and results from P-21 have decreased significantly from historic highs. As shown in Table 1, accumulated silt in P-21 is in excess of 8 feet. P-21 should be redeveloped.

- P-37: The measured well depth at monitoring well P-37 is approximately 19 feet shallower than the original construction depth. P-37 is apparently damaged. There is no evidence of impacts at this location and no need to continue sampling this well in the future. Water level measurements from this well may provide some context for understanding the Zone B potentiometric surface; however, the current updates to the site conceptual model suggest that Zone B consists primarily of braided stream deposits and sand lens and it is not clear that monitoring the potentiometric surface in monitoring well P-37 provides meaningful data. P-37 will be reevaluated following completion of the RMP to determine if it should continue to be used or plugged and abandoned.

- P-44 – Although monitoring well P-44 has a significant accumulation of silt, there have never been reported impacts at this well and based on our current understanding of the site the well does not appear to located in a critical location. This well could be plugged and abandoned.

- D-1: The total depth measured at monitoring well D-1 corresponds closely with the original construction depth; however, there appears to be an issue at D-1. In the 1st Q 2013, an elevated pH was noted at the well, and the sample was more turbid than usual. The field sampler noted that a rust converting primer or other paint had been recently

used on the outer casing. The tubing was pulled and a submersible pump lowered into the well in order to redevelop the well. The well was purged until parameters returned to the normal rand; however, the pump could not be lowered past a depth of approximately 20 feet below grade due to an obstruction or bend in the riser pipe. It is unclear if D-1 is compromised and additional investigation of the well should be completed to determine if representative samples can be obtained from the well or if the well is compromised.

- D-15: Approximately six feet of silt has accumulated in monitoring well D-15. This well should be redeveloped.

2.1.4 Zone C Wells

There are 28 monitoring wells screened in Zone C, based on the current site model. The conceptual site model is being updated in the RMP currently being prepared and some wells currently identified as Zone C wells may be reclassified as Zone B wells. Likewise, some Zone B wells may be reclassified as Zone C wells. Based on the total depth measurements presented in Table 1, several wells may need redeveloped. In addition, several Zone C wells may have failed and should be plugged and abandoned. Problematic Zone C wells are summarized below.

- D-6/D-8: Monitoring wells D-6 and D-8 are part of the Zone C nested well set of D-6/D-8/D-9, with D-9 being the deepest well and D-6 the shallowest. This well cluster is located along the property boundary downgradient or cross-gradient to the VCM Area Zone C plume. COCs are consistently reported below the detection limits in these wells, although EDC was reported above the detection limit but below the PCL in D-6 in the 1st Q 2013. FPC-TX moved to an outside lab in 2012, so this detection may not be indicative of plume migration, but rather of a change in detection limits. Regardless, these three wells are key wells to monitor conditions at the property boundary. Approximately 1.5 ft of silt has reportedly accumulated in D-6. Although this is not likely to be problematic, consideration should be given to redeveloping this well. D-8 appears to have failed or have an obstruction in the well at a depth of approximately 75 feet, 45 feet above the bottom of the well. D-8 should be further investigated to determine if the well needs replaced, or is usable in its current condition. If the well is used in its current condition, low flow sampling cannot be used at the well as the intake tubing cannot be

set in the screened interval. Future sampling at D-8 should evacuate three well casing volumes prior to sampling.

- D-19 and D-34: These wells are both located in areas that should be periodically monitored. Both wells show relatively small amounts of silt accumulated which is not likely to compromise sampling of the wells.

- D-23 and D-42: These two wells are nested in the northern portion of the open field between the VCM area and the former WWTP area. The wells have relatively minor accumulations of silt; however, COCs have never been detected in these wells and they are not located in critical sampling locations, thus consideration should be given to P&A of these two wells.

- D-45: New monitoring well D-45, installed in June 2013, appears to have approximately five feet of accumulated sediment indicating that this well may need additional development.

- D-21: Monitoring well D-21 appears to have failed or is obstructed at a depth of 35 feet, approximately 37 feet above the bottom of the well. D-21 is located along the property boundary and is nested with Zone C well 3D-3 and Zone A well P-50. This well should be further investigated to determine if it is possible to retrofit the well or remove obstructions (if any). If a decision is made to P&A the well, it may not be necessary to replace the well since 3D-3 is also screened in Zone C at this location, albeit deeper than D-21. The need for this well should be reevaluated following completion of the updated RMP.

- 3D-1: Monitoring well 3D-1 appears to have failed or is obstructed at a depth of 20 feet, approximately 80 feet above the bottom of the well. 3D-1 is not impacted and is located far west of the VCM area Zone C plume. This well should be plugged and abandoned.

2.2 Potential Additional Well Locations

Based on the results of the Supplemental AOC Characterization Report (Tetra Tech 2013), additional monitoring wells are required to adequately characterize the extent of the plume. In addition, other wells may be required along the southeastern property boundary, or on the

former Brookings Property, to provide adequate coverage for the Performance Monitoring Program. Potential new well locations are discussed below.

2.2.1 Potential New Zone A Wells

The locations for three additional Zone A wells are shown in Figure 2.

- P-69 would be installed east of existing monitoring well P-68 to attempt to locate the down-gradient edge of the contaminant plume shown at P-18 and P-68.

- P-70 would be located in the general vicinity of temporary piezometer TPZ-AOC1-A5, or near new monitoring well B-4 in the former DOT area. TPZ-AOC1-A5 was installed and sampled in August 2012 and no COCs were detected. Monitoring well P-70 would provide a key location bounding the south side of the P-18/P-68 area plume and the east side of the P-56 plume in the former WWTP area.

- P-71 would be located along the property boundary south of the VCM area between new monitoring well P-65 and recovery wells RS-4/RS-5. This well would provide additional coverage for the Performance Monitoring Program along the property line in this area.

2.2.2 Potential New Zone B Wells

The locations for three additional Zone B wells are shown in Figure 3.

- B-9 would be nested with potential new location P-71 along the property boundary south of the VCM area. The location and need for this well may be reevaluated following completion of the updated RMP. Little is currently understood regarding the VCM Area Zone B plume. Monitoring well B-9 would provide additional coverage of the property boundary in the event that a portion of the VCM Area Zone B plume is moving toward the southwest.
- B-10 would be located north of TX highway 35 between the impoundments in the former WWTP area and monitoring well B-6 located on the former Brookings Property. Although below PCLs, COCs (EDC and chloroform) were detected in B-6 during the

Supplemental AOC Characterization investigation and the 3rd Q 2013 Interim Measures Groundwater monitoring. The exact location and need for monitoring well B-10 will be reassessed following completion of the updated RMP. Although the analysis is not yet complete, it appears the Zone C monitoring wells D-4, D-10, and RD-2 may actually be located in a deeper lens of Zone B.

- B-11 would be located to the southeast of monitoring well B-7. The groundwater samples collected at B-7 indicated that groundwater in this area is impacted, thus an additional well is needed to bound the southern extent of the plume. It will be difficult to place another well between B-7 and the property line due to the presence of buried pipelines, utilities and other constraints, thus B-11 will likely be located on the former Brookings Property, somewhere between B-7 and B-6. The exact location and need for monitoring well B-11 will be reassessed following completion of the updated RMP.

2.2.3 Potential New Zone C Wells

The locations for two additional Zone C wells are shown in Figure 4.

- D-48 would be nested with potential new locations P-71 and B-9 along the property boundary south of the VCM area. The location and need for this well may be reevaluated following completion of the updated RMP. D-48 would provide property boundary coverage between D-3 and D-47, south of the VCM area.
- D-49 would be located east of D-45 in the former WWTP area and would likely be nested with existing monitoring well B-4 and potential Zone A monitoring well P-70 in the former DOT area. D-49 will provide an eastern bound to the impacts identified at D-45 in the Supplemental AOC Characterization Report.

2.3 Summary of Well Recommendations

Table 2 summarizes the status and recommendations regarding each of the existing monitoring wells. Figures 2, 3, and 4, Zone A, B, and C respectively, indicate wells to be used in the Performance Monitoring Plan, wells that may be plugged and abandoned, and wells that may be maintained for potentiometric measurements only.

3.0 PERFORMANCE MONITORING PLAN FOR CAO 1

***INTRODUCTION TO FINAL PMP SECTION 3:** As discussed in Section 1.1, EPA and TCEQ directed FPC-TX to revise Section 3 of the Draft PMP and submit the Final PMP. EPA provided only one comment on Section 3.2.1. As directed, other than addressing this comment, FPC-TX has not modified Section 3 and the following text is unchanged from the October 31, 2013 Draft PMP. Information in Section 3 of the PMP will be updated under the PCO following completion of the APAR and presented as a Plume Management Zone monitoring plan in the appropriate Response Action Plan.*

The primary purpose of the Performance Monitoring Plan is to describe groundwater monitoring requirements to ensure compliance with Corrective Action Objective 1.

Corrective Action Objective 1: The groundwater cleanup objective is to contain the plume, rather than return the groundwater to its maximum beneficial use throughout the plume. The groundwater point of compliance (POC) for FPC will be at the Facility boundary (including the former Brookings property), where concentrations of chemicals of concern must be less than or equal to the maximum contaminant limits (MCLs) for drinking water. (In the event an MCL is not established for a chemical of concern, a risk-based action level will be developed.)

The Performance Monitoring Plan for CAO 1 is intended to replace the current Interim Measures Groundwater Monitoring Program. The Interim Measures Groundwater Monitoring Program was originally developed to monitoring the effectiveness of the Interim Measures, a series of recovery wells intended to hydraulically control the extent of the plume while FPC-TX completed RFI/CMS activities specified by the 1991 3008(h) Order.

Although CAO 1 specifies that the groundwater POC can be established on the former Brookings property, this is not consistent with TRRP requirements. Texas DOT owns the property (State Highway 35) between the FPC-TX facility and the former Brookings property. TRRP requires the identification of Point of Exposure (POE) wells along the down-gradient property boundary. In the event Texas DOT agrees to deed restrictions limiting the use of groundwater and the placement of wells on their property, the down-gradient point of exposure could be moved to the former Brookings property.

As required by the 3008(a) Order, FPC-TX has applied to the TCEQ for a Post-Closure Order (PCO) for the Point Comfort Facility. Upon issuance of the PCO, FPC-TX will transition corrective action activities at the facility to a TCEQ-led program under TRRP. Following completion of an Affected Property Assessment Report (APAR), a new groundwater monitoring program will be developed to support Plume Management Zones (PMZ) as part of the Remedial Action Plan(s) (RAP). It is anticipated that the final groundwater monitoring program developed as part of the RAP will differ from the current Performance Monitoring Plan for CAO 1. Specifically, the current Performance Monitoring Plan is focused on the property boundary conditions to monitor whether impacted groundwater is migrating off-site. The future PMZ related monitoring plan will also include compliance monitoring wells located near the upgradient edge or source of the plumes, and attenuation monitoring wells located along the general down-gradient axis of the plumes. A detailed PMZ related monitoring plan cannot be completed until the horizontal and vertical extent of the groundwater plumes are adequately defined, critical PCLs are identified, and the Remedial Action Plan is developed.

3.1 Overview of Monitoring Program

FPC-TX proposes to segregate the monitoring wells into four specific categories:

- Performance Monitoring Wells along the property boundary will be sampled quarterly.
- Monitoring wells where COC have been detected will be sampled annually.
- Monitoring wells that have historically been clean, but are located in key areas horizontally or vertically adjacent to known areas of contamination will be sampled biannually (every other year).
- Certain select wells will only be used for water levels to provide sufficient coverage and context for mapping area potentiometric surfaces.

Water levels will be measured at all wells quarterly. Groundwater samples will be analyzed for VOCs via SW-846 Method 8260. A report will be prepared quarterly presenting the potentiometric surface mapping and analytical data summarized in tables, figures, and graphs.

Appendix A provides an updated Groundwater Sampling and Analysis Plan (GWSAP) for the facility. The was intentionally crafted to be "generic" in that it specifically only addresses the process for conducting groundwater sampling activities and is silent regarding which wells are

sampled. This will allow more flexibility in modifying the sampling program as necessary without having to revisit the GWSAP.

Appendix B provides an updated Quality Assurance Project Plan (QAPP) for the facility. This plan is an updated version of the plan originally provided with the AOC Characterization Work Plan. The QAPP addresses project procedures after the samples have been collected and sent to the analytical laboratory including target reporting limits, data validation procedures, and reporting. In addition to groundwater, the QAPP address soil, sediment, and surface water analysis.

3.2 Performance Monitoring Wells

Monitoring wells included in the Performance Monitoring program are located along the down-gradient boundary of the FPC-TX facility. Where the existing impacted groundwater plume has advanced to the property boundary, Performance Monitoring wells were identified on the former Brookings Property south of TX Highway 35.

3.2.1 Zone A Wells

A total of 18 existing Zone A wells, and 3 potential new wells will be included in the quarterly Performance Monitoring program. The following Zone A wells located on the FPC-TX facility property will be sampled quarterly for VOCs. For ease in locating the wells on Figure 2, wells are listed from west to east.

- P-63
- P-3
- P-64
- P-65
- P-71 (Potential new well)
- RS-4
- RS-5
- P-66
- P-50
- P-51
- P-55
- P-4

- P-15
- P-56
- P-70 (Potential new well)
- P-69 (Potential new well)

The following Zone A wells located on the former Brookings property will be sampled quarterly for VOCs.

- P-58
- P-59
- P-60
- P-61
- P-62

3.2.2 Zone B Wells

A total of 6 existing Zone B wells and 3 potential new wells will be included in the quarterly Performance Monitoring program The following Zone B wells located on the FPC-TX facility property will be sampled quarterly for VOCs. For ease in locating the wells on Figure 3, wells are listed from west to east.

- B-9 (Potential new well)
- B-8
- B-7
- B-10 (Potential new well)
- B-4
- B-3

The following Zone B wells located on the former Brookings property will be sampled quarterly for VOCs.

- B-11 (Potential new well)
- B-6
- B-2

3.2.3 Zone C Wells

A total of 11 existing Zone C wells and 2 potential new wells will be included in the quarterly Performance Monitoring program The following Zone C wells located on the FPC-TX facility property will be sampled quarterly for VOCs. For ease in locating the wells on Figure 4, wells are listed from west to east.

- D-47
- D-48 (Potential new well)
- D-3
- D-6
- D-8
- D-9
- D-21
- 3D-1
- D-4
- D-10
- RD-2
- D-45
- D-49 (Potential new well)

3.3 Annual Monitoring Wells

Monitoring wells that are located in the PCLE Zone but are not included in the Performance Monitoring wells will be sampled annually. In addition, monitoring wells where COCs have been detected in the last 5 years, but where the COC concentrations are currently less than PCLs will also be sampled annually.

3.3.1 Zone A Wells

A total of 25 Zone A wells will be sampled annually. The following Zone A wells have reported COC concentrations in excess of PCLs and will be sampled annually for VOCs. For ease in locating the wells on Figure 2, wells are listed from west to east.

- P-38
- P-9
- P-31

- P-13
- RS-1
- P-36
- RS-3
- P-3
- P-67
- P-35
- P-20
- RS-2
- P-19
- RS-6
- P-57
- P-18
- P-68

The following Zone A wells have reported COC concentrations above the detection limit in the last 5 years, but are currently below the PCL and will be sampled annually for VOCs. For ease in locating the wells on Figure 2, wells are listed from west to east.

- P-40
- P-22
- P-23
- P-10
- P-14
- P-32
- P-34
- P-47

3.3.2 Zone B Wells

A total of 9 Zone B wells will be sampled annually. The following Zone B wells have reported COC concentrations in excess of PCLs and will be sampled annually for VOCs. For ease in locating the wells on Figure 3, wells are listed from west to east.

- D-1
- D-7
- D-15
- RD-3
- P-12
- D-32
- D-33
- B-1

The following Zone B wells have reported COC concentrations above the detection limit in the last 5 years, but are currently below the PCL and will be sampled annually for VOCs. For ease in locating the wells on Figure 3, wells are listed from west to east.

- P-21

3.3.3 Zone C Wells

A total of 11 Zone C wells will be sampled annually. The following Zone C wells have reported COC concentrations in excess of PCLs and will be sampled annually for VOCs. For ease in locating the wells on Figure 4, wells are listed from west to east.

- D-11
- D-2
- RD-1
- D-12
- D-13
- D-14
- D-41
- D-39
- D-16

The following Zone C wells have reported COC concentrations above the detection limit in the last 5 years, but are currently below the PCL and will be sampled annually for VOCs. For ease in locating the wells on Figure 4, wells are listed from west to east.

- D-5
- D-34
- D-46

3.4 Bi-Annual Monitoring Wells

Monitoring wells that have historically been clean, but are located in key locations horizontally or vertically adjacent to known areas of contamination will be sampled biannually (every other year).

3.4.1 Zone A Wells

A total of 3 Zone A wells will be sampled biannually for VOCs. For ease in locating the wells on Figure 2, wells are listed from west to east.

- P-39
- P-46
- P-33

3.4.2 Zone B Wells

A total of 3 Zone B wells will be sampled biannually for VOCs. For ease in locating the wells on Figure 3, wells are listed from west to east.

- D-18
- D-40
- D-43

3.4.3 Zone C Wells

A total of 3 Zone C wells will be sampled biannually for VOCs. For ease in locating the wells on Figure 3, wells are listed from west to east.

- D-19
- D-22
- D-44

3.5 Water Level Only Wells

Seven Zone A monitoring wells are being considered for water level measurements only. These well have historically been clean, and it does not appear that additional sampling and analysis at these wells is warranted. However, continuing to monitor the water levels in these well may provide key data to provide sufficient coverage and context for mapping area potentiometric surface data. Following completion of the RMP, these wells will be reevaluated and may possibly be recommended for P&A. The following Zone A wells are current proposed as water level only wells:

- P-11
- P-41
- P-7
- P-42
- P-43
- P-45
- P-8

3.6 Summary Of Performance Monitoring Plan

A total of 41 wells will be sampled quarterly, including three potential new Zone A, three potential new Zone B, and two potential new Zone C wells.

A total of 46 wells will be sampled annually.

A total of 11 wells will be sampled biannually.

Seven wells are currently proposed for water level measurements only.

Ten wells are currently proposed for P&A.

The plan summarized above does not include the five wells currently classified in Zone P. These wells are being evaluated as part of the conceptual model in the updated RMP and will be incorporated into revisions of this Performance Monitoring Plan.

4.0 COX CREEK SAMPLING FOR CAO 4

INTRODUCTION TO FINAL PMP SECTION 4: As discussed in Section 1.1, EPA and TCEQ directed FPC-TX to revise Section 4 of the Draft PMP and submit the Final PMP. As directed, other than addressing the relevant comments, FPC-TX has not modified Section 4 and the following text is unchanged from the October 31, 2013 Draft PMP. Information in Section 4 of the PMP will be finalized and implemented in accordance to a schedule included in the Post Closure Order.

As directed by EPA, FPC-TX developed a sampling plan to monitor surface water and sediment in Cox Creek in the general vicinity of AOC 1. This plan is intended to comply with CAO 4.

Corrective Action Objective 4: The corrective action objective for surface water and sediment is to assure protection of human and ecological receptors by monitoring contaminant levels in surface water features associated with Areas of Concern (AOCs).

4.1 Sampling Objectives and Overview

The sampling program designed for this assessment is based on identifying the presence or absence of COCs in Cox Creek surface water and sediment in the stream reach adjacent to and downstream of the Areas of Concern identified in the pre-1990 facility area.

Figure 5 presents proposed surface water and sediment sampling locations. A total of six surface water and six sediment samples will be collected. The furthest upstream sample will be collected north of the Texas Highway 35 bridge. Downstream samples are spaced approximately 1,000 feet apart.

Sediment samples will consist of a surface grab sample and will be collected with a dredge-type sampler (e.g., Eckman Dredge). Surface water samples will be collected from approximately one-foot above the sediments using a discreet sampling device (e.g. Beta bottle sampler). Both sediment and surface water samples will be analyzed for VOCs via SW846 Method 8260.

Physico-chemical parameters will be measured at each of the six sample locations. Dissolved oxygen, pH, temperature, salinity, specific conductivity, turbidity and oxidation reduction potential (ORP) will be measured with a submersible Horiba U-22XD multiprobe or similar instrument. Parameters will be measured within six to 12 inches above the sediment surface at the bottom of the creek.

4.2 Field Procedures

Project-specific field procedures are discussed in the following sections. Any significant deviation in the field procedures will require Project Manager review and approval prior to completing the work.

4.2.1 Sample Locations

Sample sites will be located using a differential global positioning satellite (GPS) unit (Trimble GPS Pathfinder® Pro XRS receiver) with real time corrections (OmniStar) and Trimble Pathfinder Office or equivalent GPS unit. This particular unit provides sub-meter resolution, allowing for accurate navigation to sampling locations. The target locations are plotted on Figure 5

4.2.2 Boat Procedures

Sediment and surface water sampling will be conducted from a small support boat. The boat will navigate into position as close as possible to the targeted location. Upon confirming the boat is correctly positioned, a three anchor system will be used to hold the boat in position while sampling is conducted.

Once the boat is secure, a final GPS position will be taken at the point where the sampling equipment will be lowered. This position will contain an X- and Y- coordinate and an elevation of the sampling platform. The final position will be compared to the predetermined sample position and noted in the field log/form. A weighted tape and/or electronic sonar will be utilized to determine the distance from the sampling platform to the water surface and from the sampling platform to the top of the sediment.

4.2.3 Physico-chemical Parameters

Physico-chemical parameters will be measured in surface water at each of the 6 sample locations. Dissolved oxygen, pH, temperature, salinity, specific conductivity, turbidity and

oxidation reduction potential (ORP) will be measured with a submersible Horiba U-22XD multiprobe or similar instrument. Parameters will be measured within six to 12 inches above the sediment surface at the bottom of Cox Creek. All results will be recorded on the appropriate field forms (Appendix A)

4.2.4 Water Sampling

Following collection of the Physico-chemical parameters, a beta-bottle sampler or other discrete sampling device will be lowered to approximately 12 to 18 inches above the base of the creek. The sampler will be opened and a discrete sample collected. The sampler will be retrieved and the sample immediately transferred into the appropriate VOA containers.

4.2.5 Sediment Sampling

Six sediments samples will be collected using a dredge type sampler from a support boat. The dredge is a device that can be easily lowered into the water down to the top of the sediment surface and manually activated to close the jaws of the dredge. A single dredge sample should provide sufficient volume for analysis.

After retrieving the dredge from the creek, the water (if any) will be decanted from the dredge so that the sediment sample does not contain excess water and minimal sediment fines are lost. Water will be allowed to decant back into Cox Creek.

Sampling personnel will transfer the sediment into appropriate sample containers, taking are to remove any material such as rocks, shells, marine organisms, etc. so that only sediment remains. The types and quantity of material removed from the sediment sample, if any, will be noted in the field notes.

4.2.6 Decontamination Procedures

Effective decontamination procedures are required in order to prevent potential cross-contamination. Disposable sampling equipment will be used when available. Such equipment will be removed from protective packaging immediately before being used and will be discarded after being used. Reusable sampling equipment that is in direct contact with the media to be sampled will be decontaminated before each use. Decontamination will be conducted as follows:

- Residual sediments will first be rinsed off using water from Cox Creek;
- Equipment will then be scrubbed with deionized water and soap (Alconox);
- Deionized water rinse;

Decontaminated field equipment will be covered with clean plastic or foil if the equipment is not used immediately after cleaning.

4.2.7 Management of Investigation Derived Waste

The field activities described in this plan will generate investigation-derived wastes (IDW) consisting of water from decontamination of the equipment and used personal protective equipment. The wastes will be placed in appropriate containers and disposed of in accordance with FPC-TX procedures. The volume of the IDW generated will be minimized to the extent possible.

4.3 Sample Analysis and Reporting

All samples will be submitted to a Texas certified analytical laboratory. Samples will be analyzed for VOCs via SW 846 Method 8260. A TRRP data package will be prepared by the laboratory. The Sampling and Analysis Plan (Appendix A) will include tables with the regulatory and target reporting limit for each analyte in accordance with 30 TAC 350.54 and TRRP-24.

Data will be reviewed and validated. A summary report describing the sampling procedures and analytical results will be prepared.

4.4 Quality Assurance and Quality Control

The overall QA objective for this project is to implement procedures for field sampling, chain of custody, laboratory analysis and data reporting that will provide results of known quality that can support future assessment, human health risk assessment, ecological risk assessment, and feasibility study, as needed. An updated version of the QA/QC plan is included in Appendix B.

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